



**PUBLIC UTILITIES  
DEPARTMENT**

**PERFORMANCE AUDIT**

**JULY 1, 2013 THROUGH APRIL 30, 2016**

**CITY OF CHESAPEAKE, VIRGINIA  
AUDIT SERVICES DEPARTMENT**



June 30, 2016

The Honorable Alan P. Krasnoff and  
Members of the City Council  
City of Chesapeake  
City Hall – 6<sup>th</sup> Floor  
Chesapeake, Virginia 23328

Dear Mayor Krasnoff and Members of the City Council:

We have completed our review of the Public Utilities (PU) Department for the period July 1, 2013 to April 30, 2016. Our review was conducted for the purpose of determining whether the Department was providing services in an economical, efficient, and effective manner, whether its goals and objectives were being achieved, and whether it was complying with applicable Federal, State, City, and Department regulations and procedures related to their water and sewer operations, management oversight, contract management, cash handling, payment processing, safety, security, information technology, and facility operations.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusion based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The Department provided essential services to the City of Chesapeake (City). Its primary purpose was two-fold: 1) to provide treatment and distribution of quality drinking water for Chesapeake citizens which met or exceeded minimum quality standards and, 2) to maintain and operate sanitary sewer infrastructure within City Utility Franchise areas. In order to provide this service, the Department maintained thousands of miles of pipeline to deliver potable water and receive wastewater. The Department treated its own raw water and serviced the majority of Chesapeake with City water while several private firms supplied water to a small percentage of City residents. The Department did not treat its own wastewater; rather the sewer lines delivered the wastewater from City fed lines to larger mains owned and operated by the Hampton Roads Sanitation District (HRSD), which treated the wastewater.



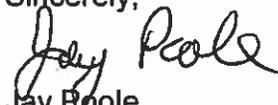
For Fiscal Year (FY) 2014-2015, the Department had an operating budget of slightly over \$61 million and an authorized compliment of approximately 212 personnel with the majority located in either Maintenance and Operations or Water Production. The Department operated as an enterprise fund for the sale and resale of water. As such it reported just over \$69 million in Gross Revenue and just under \$16.5 million in Operating Income for FY 2014-2015. The Department occupied offices on the second floor of the City Hall Municipal Building and the Executive Drive Maintenance and Operations Center. In addition, Public Utilities operated two water treatment plants and over 300 pump stations and other remote facilities.

To conduct this audit, we reviewed and evaluated City and Department policies and procedures, operations documents, and reports, both internal and external. We reviewed a consultant's evaluation of the Department's warehouse operation. We also reviewed standards and guidelines of the American Water Works Association (AWWA) and compared them to actual operations. We compared data in Maximo, the Department's inventory and time management system, against actual inventory and time data. We conducted tours of the various Department facilities. We discussed these audit areas and conducted interviews with the Director of Public Utilities, Fiscal Administrator, other Department administrators, superintendents, accounting staff, and various employees.

Based on our review, we determined the Department had accomplished its overall mission of providing the citizens of Chesapeake a reliable and sufficient supply of safe drinking water and a reliable wastewater collection system through responsive, efficient and cost effective operation. However, we did identify several areas of concern that needed to be addressed. Those areas included the pro rata program, contract administration, water production, inventory and warehouse operation, aging of meters, and policies and procedures.

This report, in draft, was provided to Department officials for review, and response, and their comments have been considered in the preparation of this report. These comments have been included in the Managerial Summary, the Audit Report, and Appendix A. Department management, supervisors, and staffs were very helpful throughout the course of this audit. We appreciated their courtesy and cooperation on this assignment.

Sincerely,



Jay Roole

City Auditor

City of Chesapeake, Virginia

C: James E. Baker, City Manager  
Robert Geis, Deputy City Manager  
David Jurgens, Public Utilities Director



## **Managerial Summary**

### **A. Objectives, Scope, and Methodology**

We have completed our review of the Public Utilities (PU) Department for the period July 1, 2013 to April 30, 2016. Our review was conducted for the purpose of determining whether the Department was providing services in an economical, efficient, and effective manner, whether its goals and objectives were being achieved, and whether it was complying with applicable Federal, State, City, and Department regulations and procedures related to their water and sewer operations, management oversight, contract management, cash handling, payment processing, safety, security, information technology, and facility operations.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusion based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The Department provided essential services to the City of Chesapeake (City). Its primary purpose was two-fold: 1) to provide treatment and distribution of quality drinking water for Chesapeake citizens which met or exceeded minimum quality standards and, 2) to maintain and operate sanitary sewer infrastructure within City Utility Franchise areas. In order to provide this service, the Department maintained thousands of miles of pipeline to deliver potable water and receive wastewater. The Department treated its own raw water and serviced the majority of Chesapeake with City water while several private firms supplied water to a small percentage of City residents. The Department did not treat its own wastewater; rather the sewer lines delivered the wastewater from City fed lines to larger mains owned and operated by the Hampton Roads Sanitation District (HRSD), which treated the wastewater.

For Fiscal Year (FY) 2014-2015, the Department had an operating budget of slightly over \$61 million and an authorized compliment of approximately 212 personnel with the majority located in either Maintenance and Operations or Water Production. The Department operated as an enterprise fund for the sale and resale of water. As such it reported just over \$69 million in Gross Revenue and just under \$16.5 million in Operating Income for FY 2014-2015. The Department occupied offices on the second floor of the City Hall Municipal Building and the Executive Drive Maintenance and Operations Center. In addition, Public Utilities operated two water treatment plants and 300 pump stations and other remote facilities.

To conduct this audit, we reviewed and evaluated City and Department policies and procedures, operations documents, and reports, both internal and external. We reviewed a consultant's evaluation of the Department's warehouse operation. We also reviewed standards and guidelines of the American Water Works Association (AWWA) and compared them to actual operations. We compared data in Maximo, the Department's inventory and time management system, against actual inventory and time data. We conducted tours of the various Department facilities. We discussed these audit areas and conducted interviews with the Director of Public Utilities, Fiscal Administrator, other Department administrators, superintendents, accounting staff, and various employees.

## **Major Observations and Conclusions**

Based on our review, we determined the Department had accomplished its overall mission of providing the citizens of Chesapeake a reliable and sufficient supply of safe drinking water and a reliable wastewater collection system through responsive, efficient and cost effective operation. However, we did identify several areas of concern that needed to be addressed. Those areas included the pro rata program, contract administration, water production, inventory and warehouse operation, aging of meters, and policies and procedures.

This report, in draft, was provided to Department officials for review and response, and their comments have been considered in the preparation of this report. These comments have been included in the Managerial Summary, the Audit Report, and Appendix A. Department management, supervisors, and staffs were very helpful throughout the course of this audit. We appreciated their courtesy and cooperation on this assignment.

## **B. Performance Information**

Most Chesapeake residents did not realize that when they turned on the tap to get a glass of water they were drinking award winning water. In April 2016, PU participated in the AWWA Water Service and Distribution Rodeo and won first place in the state for taste. Chesapeake's municipal tap water was declared the "Judge's Choice Tap Water" in a non-scientific taste test conducted by the Virginia Chapter of the American Water Works Association (AWWA). To achieve the "Judge's Choice" award, Chesapeake water was rated in four categories: Clarity, Odor, Flavor, and Aftertaste. With the award the Department more than met its goal of providing a reliable and sufficient supply of safe drinking water. In addition to providing safe drinking water that tasted great, the Department also operated a reliable wastewater collection system. The Department was working twenty four hours a day maintaining sufficient water pressure in the system, ensuring wastewater pump stations were operating, and detecting, and solving, bacterial irregularities in the drinking water. If the need to fight a fire occurred, PU was able to monitor the system to ensure that sufficient water pressure was available at the scene.

Public Utilities was divided into five functional divisions and eight service areas: Administration; Water Production (Lake Gaston and Northwest River); Engineering; Maintenance and Operations (which was subdivided into M&O – Sewer and M&O – Water); and Billing and Customer Service, which handled the meter reading service. Each division carried out an essential function independent from the others. A new Department Director started in January 2014. Since that time, the new Director has filled the following direct report positions: Assistant Director (January 2015), Fiscal Administrator (April 2015), Utility Engineer (April 2015), Water/Wastewater Administrator (August 2015), and Safety Inspector II (November 2015).

Water Treatment Plant staff received several recognitions:

- On June 11, 2014, the Lake Gaston WTP changed the coagulant it used from ferric chloride to aluminum chlorohydrate to improve water treatment processes and extend the life of the membrane filters. On October 9, 2014, a presentation on the successful coagulant conversion at the Lake Gaston WTP was made at the AWWA Senior Operators Conference. The change in the coagulant was expected to extend the life of the membrane filters from about two years to an expected 8-10 years with a potential savings of \$6 million.
- On October 25, 2013, PU staff designed and constructed a chlorine booster station at the Western Branch Ground Tank. The station allowed the City to maintain high water quality in the area of the City that received Portsmouth water. In September, PU's Water Quality staff discussed the success of this project at the AWWA state conference on Nitrification in Consecutive Systems.
- On April 6, 2016, the Center for Disease Control and Prevention presented PU's Northwest River WTP the Water Fluoridation Quality Award for consistent and professional adjustment of the water fluoride content to the optimum level for oral health for 12 consistent months for 2013 and 2014

### **C. Pro Rata Program**

The pro rata program was implemented in 1984 by PU. The pro rata program apportioned the cost of major infrastructure to the developers using the improvements. The intent was to encourage continued development in Chesapeake and equitably allocate those costs to the parties who received the benefit. In the early stages of the program, there were only a small number of pro rata projects. By 2016, the number of projects had grown to approximately 200 projects. Over the years, the engineering staff had not grown in proportion to the volume increase in the number of pro rata projects. The calculation process required to determine the amount of pro rata for first developers was a time consuming process. The engineering staff could not maintain the volume of pro rata calculations in addition to their normal project oversight responsibilities.

In addition, engineering management made the decision to make pro rata projects a low priority unless development was delayed (project pro rata work was escalated in those cases). Management also did not provide adequate oversight and monitoring to determine the impact of their decisions on the effectiveness of the pro rata program. Therefore, pro rata calculations were not completed timely, documentation was not complete, and receipt and disbursements of payments to developers were not made timely. PU was aware of the issues and requested that Audit Services examine them.

## **1. Pro Rata Engineering**

**Finding** - The process in place for the handling of pro rata development projects was inefficient, labor intensive, and time consuming. The engineering staffing levels were not sufficient to handle the volume of pro rata projects approved by PU. In addition, pro rata projects were not a priority for PU Engineering. Therefore there was a lack of management review, monitoring, and oversight over these projects for many years. Further, pro rata policies and procedures lacked sufficient detailed information for the handling of pro rata projects and had not been substantially updated since the inception of the program.

**Recommendation** – The Engineering Division should strongly consider reevaluating their process for handling pro rata projects. The pro rata calculation process should be streamlined to become less time consuming. In addition, Engineering should provide additional oversight and monitoring over pro rata projects. Further, policies and procedures should be updated.

**Response** - As a result of internal actions relating to the pro-rata program, working with the City Attorney's office, DPU staff committed in 2015 to fully evaluating and modifying the pro-rata program. It was recognized at that time that:

- the engineering portion of the process was very labor intensive and time consuming;
- there was insufficient involvement from DPU's Accounting staff;
- the program had become difficult, if not impossible, to properly manage as it was currently structured; and
- the program objectives are excellent, it is the mechanisms that need to be modified.

As a result of this realization, I specifically requested the Internal Audit team conduct a thorough review of the pro-rata program in our opening meeting. Having now received the evaluation from the Auditor, DPU is working on proposed revisions to the pro rata policy and procedure. Pro-rata is a City Council policy, and any changes must be formally approved by the City Council. The procedure may be revised by the DPU Director. (Note: The full text of the response is included in the audit report.)

## **2. Pro Rata Accounting**

**Finding** - PU revenue reflected on the City's Comprehensive Annual Financial Report (CAFR) had been overstated and liabilities understated for numerous years. Subsidiary records for pro rata projects had not been kept up to date and had not been reconciled to the general ledger. Also, the Accounting Division did not have a complete understanding of the pro rata project process. Communication between the Engineering and Accounting Divisions was limited even though the divisions were dependent on each other to ensure proper accounting for pro rata projects. Further, accounting policies and procedures for the handling of pro rata payments and disbursements needed to be updated.

**Recommendation** – Incoming pro rata payments should be posted to liability accounts verses revenue accounts. Subsidiary records should be kept up to date and be periodically reconciled to the general ledger. The Accounting Division should have a complete understanding of the pro rata process. The lines of communication between the Accounting and Engineering divisions should remain open at all times. In addition, pro rata policies and procedures for the Accounting Division should be updated and followed.

**Response - PU Engineering and Accounting have worked together a great deal to increase the combined teams' understanding of the pro rata process. Whereas Accounting was minimally involved in the program since its inception, that has changed, and they are now integrally involved in the process. (Note: The full text of the response is included in the audit report.)**

## **D. Maintenance and Operations (M&O)**

Our review of the M&O Division noted that the water meter section of the M&O Division had not tested all large meters once each year as required. Also, water meters over 15 years old had not been replaced as recommended. In addition, refurbished meters were not being returned into Maximo inventory records after repairs were completed. Further, documented policies and procedures were lacking in all three of the areas addressed. The underlying cause for meter testing and replacement not being performed as required was insufficient staffing.

### **1. Aging Meters**

**Finding** – The M&O Division had not replaced all aging residential (5/8" to 2") water meters which were over fifteen (15) years old as recommended. In addition, the fifteen (15) year guideline was not documented in the division's policy and procedures.

**Recommendation** – PU should develop and implement a realistic residential meter replacement program. Additionally, PU should consult with Human Resources to evaluate the cause of the continual vacant positions in the Water Service Section of the M&O Division and develop a plan to mitigate the continual vacancy issue. Further, meter replacement policies and procedures need to be documented.

**Response - Public Utilities concurs on the need for a realistic residential water meter replacement program and such documented policies and procedures. Public Utilities is requesting several additional positions over the next three year budget cycle to assist with the meter replacement program. As resources become available, PU will continue to replace broken water meters and those over 25 years old as first priorities. Expansion of the Automatic Meter Reading (AMR) program throughout the City may also dictate the order in which meters are replaced. (Note: The full text of the response is included in the audit report.)**

## **2. Large Meter Testing**

**Finding –** The M&O Division had not consistently performed annual testing of large (3” to 10”) water meters. In addition, the annual testing process was not documented in the division’s policy and procedures.

**Recommendation –** PU should develop and implement a large meter testing program that can be accomplished with the staffing level of the Water Service section. Additionally, the Department should consult with Human Resources to evaluate the cause of the continual vacant positions in the Water Service Section and develop a plan to mitigate this issue. Further, large meter testing policies and procedures need to be documented.

**Response –** Currently Public Utilities has over 800 large meters (> 2”) that are tested by two staff members in Water Services. These two staff members also perform other duties including large meters repairs, register or touchpad repairs, 1½” - 2” meter change-outs, special meter tests, and numerous large meter re-reads. With current staffing, and as commercial development continues to grow, PU will be unable to meet the goal of testing large meters annually. Public Utilities is requesting an additional two positions over the next three year budget cycle specifically to assist with large meter testing. To annually test approximately 800 large water meters, two 2 man crews would be needed. (Note: The full text of the response is included in the audit report.)

## **3. Meter Tracking**

**Finding –** The Meter Shop did not have written procedures for tracking new and refurbished meters.

**Recommendation –** The Meter Shop should develop written procedures for tracking new and refurbished meters.

**Response –** PU currently does not have a specific written procedure for tracking meters, but meters are tracked. All new meters purchased by the City are entered into the Customer Information System (CIS), which maintains the key meter information by individual meter number. The physical location of meters are also documented within CIS, as well as the meter number tied to that location. Large

batch purchases are entered into CIS by the IT department. Meter purchases for meter sizes larger than residential meters are entered manually in CIS by the Meter Shop Supervisor. Maximo, which is used for work orders, contains meter location and number, but requires a search by address, as meter information in Maximo is not updated due to limited staffing and the fact that it is not absolutely necessary. (Note: The full text of the response is included in the audit report.)

#### **4. Inventory Process**

**Finding** – PU’s inventory process was cumbersome, lacked adequate segregation of functions, and inventory counts in Maximo were not always accurate.

**Recommendation** – PU should take steps to streamline inventory processes, improve segregation of functions, and improve inventory accuracy.

**Response** - In March 2016, PU added a new Accountant I position to compliment staff, specifically to improve the separation of duties with M&O purchasing and warehousing functions. The position has been filled and the selected candidate works at the M&O facility adjacent to the storeroom and yard storage areas. A Separation of Duties matrix was developed and initiated in late March 2016 to differentiate storeroom and accounting responsibilities. (Note: The full text of the response is included in the audit report.)

#### **5. Data Entry**

**Finding** – The Water Services and Water Distribution Superintendents spent significant time performing data entry work.

**Recommendation** – PU should take steps to reduce the time necessary for performing data entry work.

**Response** - A new Data Control Tech II position for data entry is proposed in the FY18 budget cycle. So far, other operational needs have outweighed the needs for the data entry position. Other changes have been made with existing personnel to reduce the burden on the superintendents. A meter technician position was converted to an Office Assistant I, who performs significant data entry. Additionally, Crew Leaders and General Supervisors have been equipped with field laptops with data connections to be used in the field to input information into the Maximo asset management system. (Note: The full text of the response is included in the audit report.)

#### **6. Work Orders**

**Finding** – PU’s Water Service did not utilize Maximo to track all elements of work order completion.

**Recommendation** – PU should contact Public Works and Information Technology to determine whether the “workaround” solution they were using could be used by the Water Service.

**Response - Public Utilities Water Service section does not utilize all the functionality of Maximo with regard to tracking temporary employee time for work orders. Although this information is helpful, it is not critical unless we are performing a job for which we will send an invoice for reimbursement. With very limited staff (currently 8 vacancies), tracking this information for non-bill jobs is not worth the time it takes. (Note: The full text of the response is included in the audit report.)**

## **7. GIS**

**Finding** – PU was not optimizing its use of GIS to consistently record reliable and complete information of the water distribution piping and components.

**Recommendation** – PU should optimize its use of GIS to consistently record reliable and complete information of the water distribution piping and components.

**Response - While we do not currently use our GIS system to its full capacity, we are making progress on getting our data more up to date in the GIS. This will start with getting accurate GPS data (6 inch accuracy) for all surface hardware- manholes, fire hydrants, meter boxes, cleanouts, valves, etc. This will provide a 90% solution for the physical location of all of our buried assets, excluding depth information. To facilitate this process, we purchased one field GPS units this year and plan to purchase one more in FY17 to capture more data. This effort involves GPS’ing more than 150,000 unique surface assets; this is a 20-year data gathering effort. (Note: The full text of the response is included in the audit report.)**

## **8. Warehouse Conditions**

**Finding** – Physical conditions at the PU warehouse and outside storage area needed improvement.

**Recommendation** – PU should work with Facilities Management to make necessary repairs.

**Response – A new combined Public Works (PW) Public Utilities Operations facility has been planned for several years. Because it has been in and out of the planning and design phases, it has not seemed prudent to spend funds maintaining facilities that will soon be razed and removed. As a result, only minimal funds have been spent maintaining the physical features at the M&O facility on Executive Drive. While the new facility location is being determined, PU will work with Facilities Management to make suggested essential repairs. (Note: The full text of the response is included in the audit report.)**

## **E. Customer Information System (CIS)**

We noted that reconciling differences between PU's Customer Information system and the Hampton Roads Sanitation District system were not researched and cleared in a timely fashion. Thus, the accuracy of some customer accounts was placed at risk.

### **1. CIS Reconciliation**

**Finding** – Reconciling differences between the Customer Information System (CIS) and the Hampton Roads District system (HRSD) were not researched and cleared in a timely manner.

**Recommendation** – The CIS and HRSD systems should be reconciled daily and all reconciling items be researched and cleared in a timely manner.

**Response** - The issues cited for the audit have been resolved, and systems established to ensure that any future issues are quickly identified. CIS and HRSD systems are reconciled daily and any differences are identified, researched, and cleared in a timely manner. The PU IT Systems Analyst is much more comfortable with the system, and Accounting and Customer Service are working together when problems are identified. We have established a much better understanding of each of our software systems, the interfaces between them, and the interaction required between departmental teams.

## **F. Customer Service – Cash & Settlement - Billing**

Customer billing experienced a significant backlog during 2015, resulting initially in skipped bills and later in enlarged bills to customers. Also cash handling and settlement procedures needed to be enhanced.

### **1. Billing**

**Finding** – Customer billing was behind by over 2,500 service orders for several months during 2015. This created multiple instances where customers' bills were skipped and then "caught up" by being billed for four months on their next cycle.

**Recommendation** – PU should ensure that service orders, "rereads," and other exceptions are handled in as expeditious a manner as possible.

**Response** - The difference between the number of Tab Rereads (internally generated) and the reported 2,500 open service orders may be from two separate reports. The numbers are measuring different things. There is a Smartlist (CIS generated report) that identifies the total number of open service orders in CIS. This includes customer requested rereads, Tab Rereads, and all other types of service

orders. This report has exceeded 2,500 open service orders that the division is placing great emphasis in completing. (Note: The full text of the response is included in the audit report.)

## **2. Cash Handling and Settlement**

**Finding** - The cashiering process in place for PU Customer Service was inefficient and was not designed to promote good customer service. In addition, procedures for cash handling, petty cash (p/c) and settlement processes did not sufficiently address cash handling, petty cash, settlement, internal controls, and the safeguards over assets needs to be enhanced.

**Recommendation** – PU Customer Service should develop and document cash handling, cash settlement and petty cash processes so that cash is adequately safeguarded. In addition, PU customer service should develop an ongoing oversight and monitoring process to ensure adherence to cash handling and cash control procedures.

**Response** - During this review period we have taken steps to increase our internal controls. Acknowledgment of this concern was evident when the decision was made to add a position to this area in customer service. In October 2015, we hired a former bank manager to further drive changes needed to our internal controls. Since her arrival, we have made many changes. (Note: The full text of the response is included in the audit report.)

## **G. Water Production**

Our review of the water production and distribution areas identified an issue related to nuisance birds. The design and operation of the water treatment plants attracted these birds, and their presence created facility and health risks.

### **1. Nuisance Birds**

**Finding** – The Water Treatment Plants' (WTP) design and operation attracted nuisance birds that caused corrosion and potential spread of disease to workers and visitors around the facilities.

**Recommendation** – Public Utilities should work with the appropriate federal and state agencies to address the issue.

**Response** - Many forms of goose control were deemed to not be appropriate for our water treatment facilities on Battlefield Blvd. or Western Military Highway. Earlier this year, DPU purchased decoy coyotes which function to scare away geese and other nuisance birds from our water treatment facilities. To date, it appears these coyotes have been effective. We are currently evaluating bird netting and other

**systems to reduce or eliminate pigeon access to the water treatment area. (Note: The full text of the response is included in the audit report.)**

## **H. Contracts**

We noted several areas where contracting practices could be enhanced. Some contracts lacked some technical information, applicable inflation indices were not always specified.

### **1. Contracts**

**Finding** – Contracting practices for Public Utilities could be enhanced.

**Recommendation** – PU should work with Purchasing to enhance its contracting practices.

**Response** - Public Utilities requested and was approved to hire a new senior engineer to serve as a Capital Project Manager as part of the FY17 budget. This individual will bring management of our capital program under one supervisor. Standardizing and improving our contracts is one of this individual's specific objectives. This individual will also provide quality control over our capital contracting process. Most of the identified situations and recommendations are relevant to capital contracts, and will be under this individual's purview.



PUBLIC UTILITIES DEPARTMENT

PERFORMANCE AUDIT

JULY 1, 2013 TO APRIL 30, 2016

Table of Contents

<u>Contents</u>	<u>Page</u>
A. Objectives, Scope, and Methodology	1
B. Performance Information	4
C. Pro Rata Program	11
D. Maintenance and Operations (M&O)	25
E. Customer Information System (CIS)	48
F. Customer Service – Cash and Settlement – Billing	50
G. Water Production	59
H. Contracts	61
Appendix A – Response from Public Utilities Officials	
Appendix B - Pro Rata Flowchart – Simplified Version	
Appendix C - Pro Rata Flowchart – Detailed Version	



## **A. Objectives, Scope, and Methodology**

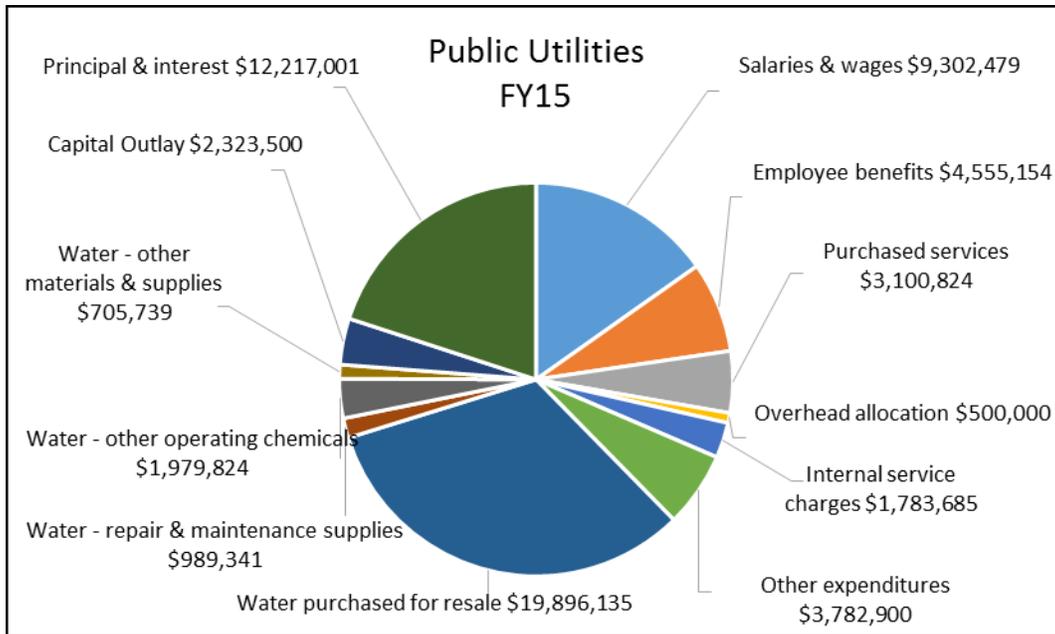
We have completed our review of the Public Utilities (PU) Department for the period July 1, 2013 to April 30, 2016. Our review was conducted for the purpose of determining whether the Department was providing services in an economical, efficient, and effective manner, whether its goals and objectives were being achieved, and whether it was complying with applicable Federal, State, City, and Department regulations and procedures related to their water and sewer operations, management oversight, contract management, cash handling, payment processing, safety, security, information technology, and facility operations.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusion based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The Department provided essential services to the City of Chesapeake (City). Its primary purpose was two-fold: 1) to provide treatment and distribution of quality drinking water for Chesapeake citizens which met or exceeded minimum quality standards and, 2) to maintain and operate sanitary sewer infrastructure within City Utility Franchise areas. In order to provide this service, the Department maintained thousands of miles of pipeline to deliver potable water and receive wastewater. The Department treated its own raw water and serviced the majority of Chesapeake with City water while several private firms supplied water to a small percentage of City residents. The Department did not treat its own wastewater; rather the sewer lines delivered the wastewater from City fed lines to larger mains owned and operated by the Hampton Roads Sanitation District (HRSD), which treated the wastewater.

For Fiscal Year (FY) 2014-2015, the Department had an operating budget of slightly over \$61 million and an authorized compliment of approximately 212 personnel with the majority located in either Maintenance and Operations or Water Production. The Department operated as an enterprise fund for the sale and resale of water. As such it reported just over \$69 million in Gross Revenue and just under \$16.5 million in Operating Income for FY 2014-2015. The Department occupied offices on the second floor of the City Hall Municipal Building and the Executive Drive Maintenance and Operations Center. In addition, Public Utilities operated two water treatment plants and over 300 pump stations and other remote facilities.

### Exhibit #1



**Public Utilities Budget for FY 14/15**

To conduct this audit, we reviewed and evaluated City and Department policies and procedures, operations documents, and reports, both internal and external. We reviewed a consultant’s evaluation of the Department’s warehouse operation. We also reviewed standards and guidelines of the American Water Works Association (AWWA) and compared them to actual operations. We compared data in Maximo, the Department’s inventory and time management system, against actual inventory and time data. We conducted tours of the various Department facilities. We discussed these audit areas and conducted interviews with the Director of Public Utilities, Fiscal Administrator, other Department administrators, superintendents, accounting staff, and various employees.

### **Major Observations and Conclusions**

Based on our review, we determined the Department had accomplished its overall mission of providing the citizens of Chesapeake a reliable and sufficient supply of safe drinking water and a reliable wastewater collection system through responsive, efficient and cost effective operation. However, we did identify several areas of concern that needed to be addressed. Those areas included the pro rata program, contract administration, water production, inventory and warehouse operation, aging of meters, and policies and procedures.

This report, in draft, was provided to Department officials for review, and response, and their comments have been considered in the preparation of this report. These comments have been included in the Managerial Summary, the Audit Report, and Appendix A. Department management, supervisors, and staffs were very helpful throughout the course of this audit. We appreciated their courtesy and cooperation on this assignment.

## **Methodology**

To conduct this audit, we reviewed and evaluated City, and Department, policies and procedures, operations, documents, and reports, both internal and external. This review included testing and evaluation of the Department's Pro Rata program. We did extensive analysis of the inconsistencies in the treatment of the various projects, the lack of proper accounting for the projects, and the general lack of project control. This analysis also included interviews with the City Attorney's Office, Finance Department, and the City's external accounting firm. We also reviewed a consultant's evaluation of warehouse operation. We reviewed standards and guidelines of the American Water Works Association (AWWA) and compared them to actual operations. We reviewed Maximo, the Department inventory and time management system. Finally, we conducted tours of the various Department facilities.

In addition to these items, we reviewed compliance with selected City and State policies and procedures. We reviewed a consultant's recently completed review of warehouse operation and reviewed various other municipalities' performance audits of their public utilities departments. We also conducted interviews with the Director of Public Utilities, administrators, superintendents, fiscal administrator, and accounting staff.

## **B. Performance Information**

Most Chesapeake residents did not realize that when they turned on the tap to get a glass of water they were drinking award winning water. In April 2016, PU participated in the AWWA Water Service and Distribution Rodeo and won first place in the state for taste. Chesapeake's municipal tap water was declared the "Judge's Choice Tap Water" in a non-scientific taste test conducted by the Virginia Chapter of the American Water Works Association (AWWA). To achieve the "Judge's Choice" award, Chesapeake water was rated in four categories: Clarity, Odor, Flavor, and Aftertaste. With the award the Department more than met its goal of providing a reliable and sufficient supply of safe drinking water. In addition to providing safe drinking water that tasted great, the Department also operated a reliable wastewater collection system. The Department was working twenty four hours a day maintaining sufficient water pressure in the system, ensuring wastewater pump stations were operating, and detecting, and solving, bacterial irregularities in the drinking water. If the need to fight a fire occurred, PU was able to monitor the system to ensure that sufficient water pressure was available at the scene.

Despite an oftentimes adverse public opinion based in part on past history and in part by events in other localities, PU met or exceeded all quality standards for a municipal water system. PU used state-of-the-art methods to purify the drinking water and maintained a laboratory designated solely for the continuous monitoring of water quality.

Also, the City of Chesapeake's Public Utility was the only utility in the Commonwealth of Virginia to operate an Aquifer Storage and Recovery (ASR) facility. Placed in operation in 1989, this facility allows the Utility to store treated water in the aquifer, saving it for future use as needed. At the same time, this storage helps replenish the aquifer, which has been significantly stressed in recent years. Overwithdrawal makes the groundwater unavailable for future residents, contributes to land subsidence, and contributes to overall reduction in the quality of the existing groundwater due to salt water intrusion. At the direction of the state legislature, the Virginia Department of Environmental Quality was making significant efforts to reduce groundwater withdrawals and restore the aquifers in the eastern portion of the State. Chesapeake's ASR has become a model for one method by which the aquifer can be protected and managed, and was being evaluated as the potential model for an area-wide aquifer injection program that has potential to significantly improve the groundwater situation in the entire eastern portion of the state.

### **1. Organization**

PU was divided into five functional divisions and eight service areas: Administration; Water Production (Lake Gaston and Northwest River); Engineering; Maintenance and Operations (which was subdivided into M&O – Sewer and M&O – Water); and Billing and Customer Service, which handled the meter reading service. Each division carried out an

essential function independent from the others. A new Department Director started in January 2014. Since that time, the new Director has filled the following direct report positions: Assistant Director (January 2015), Fiscal Administrator (April 2015), Utility Engineer (April 2015), Water/Wastewater Administrator (August 2015), and Safety Inspector II (November 2015).

## **2. Administration Division**

The Administration Division was responsible for providing overall departmental leadership and necessary supporting functions such as payroll and accounting for the PU operational divisions. The division coordinated the Department's operations, prepared the operating and capital improvement budgets, and prepared all necessary financial reports. The water quality hotline and the Utility Capital Improvement – Debt Service Fund were also managed within this division.

## **3. Water Production Division**

The Water Production Division was responsible for ensuring the safety and reliability of the City's drinking water. To meet this mandate, the Division operated two Water Treatment Plants (WTPs), namely Northwest River and Lake Gaston, and maintained several remote storage facilities.

The Northwest River WTP operated in the southern part of the City and drew its primary water source from the nearby Northwest River. The treatment plant went online in March 1980 and supplied approximately 80 million gallons monthly of clean drinking water. Due to the occasionally poor quality of the source water, this plant relied on conventional methods and a 'reverse osmosis' filtration system to treat the water. Additional treatment procedures were performed to meet established quality standards. The Northwest River WTP also housed a state-of-the-art laboratory for testing and monitoring of water as it passed through treatment processes. The laboratory also sampled water at various sites across the City to ensure that the quality standards were being maintained.

In February 2016, the Water Quality Laboratory at the Northwest River WTP completed accreditation inspections and became certified by the Virginia's Division of Consolidated Laboratory Services (DCLS) for the analysis of metals in drinking water and wastewater using new technology (Inductively Coupled Plasma-Optimal Emissions System or ICP-OES). Although both plants had laboratories, the Northwest River Water Treatment Plant was the primary location for conducting water quality testing for both source and distribution.

The Lake Gaston WTP operated in the western part of the City and was constructed to ultimately service water from the Lake Gaston watershed. In 2009, the plant used water purchased from the City of Norfolk in its raw state and treated this water using new

technological processes. When the plant was opened in 2006, the City of Chesapeake had one of the few municipal treatment plants in the country using state-of-the-art membrane filtration. Both the Northwest River and Lake Gaston plants met or exceeded all state and federal guidelines for safe drinking water

Both water treatment plants were operated simultaneously and continuously all year. Both plants' control rooms were capable of monitoring each other's individual parameters and the complete distribution system as a whole. In addition to water production, WTP staff was responsible for customer contacts after normal working hours. The control room staff was responsible for the after-hours dispatching, when needed, of on-call PU employees to resolve customer issues.

WTP staff received several recognitions:

- On June 11, 2014, the Lake Gaston WTP changed the coagulant it used from ferric chloride to aluminum chlorohydrate to improve water treatment processes and extend the life of the membrane filters. On October 9, 2014, a presentation on the successful coagulant conversion at the Lake Gaston WTP was made at the AWWA Senior Operators Conference. The change in the coagulant was expected to extend the life of the membrane filters from about two years to an expected 8-10 years with a potential savings of \$6 million.
- On October 25, 2013, PU staff designed and constructed a chlorine booster station at the Western Branch Ground Tank. The station allowed the City to maintain high water quality in the area of the City that received Portsmouth water. In September, PU's Water Quality staff discussed the success of this project at the AWWA state conference on Nitrification in Consecutive Systems.
- On April 6, 2016, the Center for Disease Control and Prevention presented PU's Northwest River WTP the Water Fluoridation Quality Award for consistent and professional adjustment of the water fluoride content to the optimum level for oral health for 12 consistent months for 2013 and 2014

#### **4. Engineering Division**

The Engineering Division served as PU's main source of technical expertise regarding water and sewer issues for developers, engineers, contractors and the general public. Engineering also advised other City departments. This division was responsible for plat and plan review for new developments, facilitated emergency operations plans, and maintained all utility plans and engineering records. Engineering also was tasked with developing City-funded utilities projects, assisting with state utility construction or relocation projects, and administering the state cross-connection control program for the City. The Public Utilities Pro Rata program, aimed at encouraging developers to help build the City's water and sewer infrastructure, was also administered by the Engineering Division.

## **5. Maintenance and Operations Division (M&O)**

The M&O Division was primarily responsible for the operation, maintenance, and repair of the thousands of miles of City water lines, sewer lines, and sewer pump stations. This division was subdivided into two primary service areas: Sewer and Water. M&O also included the PU Warehouse and the Meter Shop.

M&O – Sewer was responsible for the 24-hour maintenance and operation of approximately 960 miles of wastewater gravity mains, 105 miles of force mains, 16,000 manholes and 269 pumping stations to ensure a continuous wastewater disposal system. This division performed all routine maintenance and emergency repairs on all of the sewer mains, pump stations, and all other parts of the sewer system. M&O – Sewer also cleared out sewer blockages.

M&O – Water was responsible for the 24-hour maintenance and operation of approximately 950 miles of water distribution mains, approximately 13,000 valves, over 5000 fire hydrants and appurtenances ensuring a continuous potable water supply and adequate fire protection. This division performed hydrant tests and repairs, service pressure tests, main leak repairs, and meter and valve repair and replacement. M&O – Water Distribution also installed new water service connections. Prior to the audit both of these service areas had been directed by the M&O Administrator and PU Director to develop operational processes, and they were developing procedures for daily and emergency operations that were at varying stages of completion at the time of this report.

### **Exhibit #2**

#### **Selected Water Maintenance Performance Measures – FY 2015**

<b>Number</b>	<b>Action taken during FY 2015</b>
7	Fire Hydrant(s) Installed – NEW
2	Fire Hydrant(s) relocated or Removed
343	Fire Hydrants Painted
57	Fire Hydrants Repaired
362	Fire Hydrants Routine Maintenance (Inspected/Lubricated)
1,905	Preventative Maintenance Hours
51,434,959	Water Loss Due To Main Breaks, Flushing, Etc., (Gallons)
56	Water Main Leaks Repaired
2,305	Water Mains Installed or Relocated, (Feet)
20	Water Quality Flushing - all types

#### **a. Warehouse Operations (Storeroom):**

The storeroom's main responsibility was maintaining an adequate stock of all parts and materials to ensure the continued operation of the pump stations, water mains, service lines, wastewater gravity mains, force mains, and water service lines that made up the

water delivery and sewage recovery system. The storeroom was required to respond to work requests regardless of the time of day/night.

The storeroom was also the first line of protection to ensure that received materials were lead free in accordance with the latest Reduction of Lead in Drinking Water Act. The warehouse also coordinated PU's salvage efforts in selling damaged, or recyclable, materials such as meters and pipes.

**b. Meter Shop:**

The Meter Shop received, stored, tested, transferred, and installed meters of various sizes and types. The Meter Shop tracked all the City meters using a vendor supplied serial number for each meter. The Meter Shop also was responsible for testing and calibrating meters. The shop had portable test stands for testing large installed meters in the field and a calibrated test stand in house for bench testing meters prior to issuance.

The Meter Shop along with the Customer Service Meter crews had embarked on a project to replace meters in specific neighborhoods with new electronic meters. The new electronic meters would allow for remote reads and would benefit PU by:

- allowing quicker billing,
- increasing the accuracy of meter readings,
- lowering the cost to read meters,
- increasing the ability to detect and prevent theft of service,

**6. Billing and Customer Service Division**

The Billing and Customer Service Division was responsible for all customer accounts and activities. The Division initiated customer accounts, maintained customer histories, collected payments, and handled billing and service issues. The City and PU contracted with HRSD to provide invoicing services for all Chesapeake customers' billings. Under this contract, HRSD produced a joint invoice with both water and sewer charges and accepted payment for Chesapeake water charges and wastewater collection at all HRSD payment locations.

As a part of the Billing and Customer Service Division, Meter Reading Services was responsible for the accurate reading of customers' water meters. Meters were read every 58 – 60 days for residential customers and were invoiced every two months. Meters were read every month for commercial accounts and were invoiced monthly. The Customer Service Meter crews were also responsible for turning meters on and off, leak detection, trouble-shooting customer complaints, minor meter repair, and meter removal.

Following is a summary of Customer Service activity during FY 14 and FY 15.

**Exhibit #3  
Customer Service Division Metrics**

<b>Customer Service Summary</b>	<b>FY14</b>	<b>FY15</b>
<b>Accounts turned on</b>	3,690	3,926
<b>Accounts turned-off</b>	3,253	3,525
<b>Meters read &amp; left on</b>	4,612	5,068
<b>Re reads - mechanics</b>	27,542	26,525
<b>Meters changed</b>	763	1,729
<b>Meters removed</b>	114	88
<b>Meters reset</b>	266	232
<b>Replaced washer</b>	124	111
<b>Other</b>	10,387	20,753
<b>TOTAL SERVICE</b>	<b>50,751</b>	<b>61,957</b>

**7. Citizen Satisfaction**

A telephone survey of Chesapeake citizens was conducted by Continental Research Associates, Inc., a Hampton Roads marketing research firm. A total of 323 interviews were completed from October 1st through October 29<sup>th</sup> 2014. The purpose of the study was to learn how Chesapeake residents felt about their community and the services that were provided by the City. In this survey, 75.9% of the citizens surveyed were satisfied or extremely satisfied with the quality of the City’s drinking water. This was a 24.1% upgrade from a similar survey conducted in 2007 where the citizens surveyed were only 51.8% satisfied or extremely satisfied with the quality of the City’s drinking water.

This lack of satisfaction with Chesapeake water was an unfortunate remnant from the era before Chesapeake constructed its state-of-the-art water treatment plants. Since the upgraded Northwest River Water Treatment Plant became operational in 1999, the water quality had improved substantially and in a newspaper-conducted 1999 survey, Chesapeake water scored higher in taste tests than water from Norfolk, Portsmouth, and Virginia Beach. As previously noted, Chesapeake won a similar 2016 competition.

**8. Safety Inspector**

In November 2015 PU created the Safety Inspector position. The Safety Inspector was assigned to conduct OSHA and other safety training as well as coordinate tours of all divisions for new PU employee orientation. The Safety Inspector coordinated with other departments such as Fire to facilitate response training of Fire at PU facilities. Also, the Safety Inspector reestablished the Safety Awards Program for the PU Department.

## **9. External Concerns**

Although not within the scope of this audit, PU had three external concerns:

- a. The US Navy tested the well water at Fentress Naval Auxiliary Landing Field and included testing for the emerging contaminant of perfluorinated compounds found in Aqueous Film Fighting Foam (AFFF). The Navy used AFFF for fire-fighting training during the 1950s through 1980s. The results of the testing indicated the landing field's well water was contaminated with the perfluorinated compounds and decided to expand the testing of groundwater within a half-mile of the landing field. The Navy established a process to recoup the City's costs involved in the temporary, and permanent, recovery projects to provide City water to the affected area.
- b. Fly ash, the residue from burning coal, was buried at several locations in Chesapeake prior to the potential dangers being fully understood. Areas of South Norfolk and off Centerville Turnpike had EPA testing results showing residue in the groundwater. Dominion Resources paid about \$6 million to expand the City's water distribution to the residents around the Battlefield Golf Course. Residents in South Norfolk were already on City water.
- c. About 500 homes in the Norfolk Highlands neighborhood had their water supplied by an independent company. Some residents complained of the turbidity (cloudiness or lack of transparency), the rust discoloration, and odor concerning the private company supplied water. There was also a concern of the inadequate water pressure of fire hydrants in the service area which had an impact on the area's revitalization. The City was negotiating to improve service for area residents and other water users.

## **C. Pro Rata Program**

The pro rata program was implemented in 1984 by PU. The pro rata program apportioned the cost of major infrastructure to the developers using the improvements. The intent was to encourage continued development in Chesapeake and equitably allocate those costs to the parties who received the benefit. In the early stages of the program, there were only a small number of pro rata projects. By 2016, the number of projects had grown to approximately 200 projects. Over the years, the engineering staff had not grown in proportion to the volume increase in the number of pro rata projects. The calculation process required to determine the amount of pro rata for first developers was a time consuming process. The engineering staff could not maintain the volume of pro rata calculations in addition to their normal project oversight responsibilities.

In addition, engineering management made the decision to make pro rata projects a low priority unless development was delayed (project pro rata work was escalated in those cases). Management also did not provide adequate oversight and monitoring to determine the impact of their decisions on the effectiveness of the pro rata program. Therefore, pro rata calculations were not completed timely, documentation was not complete, and receipt and disbursements of payments to developers were not made timely. PU was aware of the issues and requested that Audit Services examine them.

### **1. Pro Rata Engineering**

**Finding - The process in place for the handling of pro rata development projects was inefficient, labor intensive, and time consuming. The engineering staffing levels were not sufficient to handle the volume of pro rata projects approved by PU. In addition, pro rata projects were not a priority for PU Engineering. Therefore there was a lack of management review, monitoring, and oversight over these projects for many years. Further, pro rata policies and procedures lacked sufficient detailed information for the handling of pro rata projects and had not been substantially updated since the inception of the program.**

Pursuant to Section 70-123 of the Chesapeake City Code, pro rata was the dollar amount by which first developers could be reimbursed for the costs associated with the design, construction, and installation of water/sewer improvements required to service on-site and off-site parcels of land in accordance with the City's water and sewer Master Plan. Subsequent developers within the utility service area of the utility improvements made by the first developer paid PU their pro rata share of the cost of such improvements. The PU engineers acted as middle men and had fiduciary responsibility for the collection and disbursement of pro rata payments. Each subsequent developer's pro rata share was determined based on their project's proportionate impact on the water/sewage total flow through the utility improvement made by the first developer.

The Engineering Division was responsible for calculating the pro rata percentages. These percentages were based on the first developer's cost of improvement and the specifics of the project plans. For the land in a pro rata utility service area, the Engineering Division calculated pro rata percentages based on these proportions of flow, and applied them to the first developer's cost of improvement. From these calculations, the share of costs reimbursable to the first developer was determined, and the developer was notified.

Once the dollar amount of pro rata was determined, the first developer had 21 days to decide how to receive pro rata reimbursements. The first developer had two options:

- Receive pro rata payments when subsequent developers made their pro rata payments to PU. Payments were made to the first developer when subsequent developers made their payments to PU engineers.
- Assign their payments to PU and collect connection fees for lots in their subdivision. These fees could not exceed the share of costs reimbursable to the first developer. . The first developer had to provide the PU engineers a list of addresses that connections fees covered. This listing was verified by engineers before payment was made to the developer.

If the signed agreement was not received by PU within 21 days, the first developer lost their option to receive connection fees.

Our review of the handling for pro rata development projects within PU revealed that policies and procedures for pro rata projects lacked sufficient detailed information on how to handle pro rata. These policies and procedures had not been updated since the inception of the pro rata program in 1984, with the exception of some limited 1997 changes. In that year, a ten-year sunset clause was eliminated based on an opinion (reaffirmed in 2016) from the City Attorney. At about the same time, several paragraphs were added addressing: calculation of select fill eligible, multiple pump stations upgraded, land use density table was updated by Planning, and City code was re-numbered. Pages were inserted, applicable text struck through, and both documents marked to refer to the newly numbered code sections. The revised policy and procedure documents were passed out to staff who worked with utility pro rata. No updates have been made since that time.

The Engineering Division had not developed standards for required documentation needed for the pro rata project file folders. These standards would provide guidance and consistency for file folder documentation amongst engineering staff. In addition, checklists indicating required documentation for file folders had not been developed to ensure that all required documentation was received. We were advised by the Engineering Division manager that pro rata projects were a lower priority for the division behind development review and CIB project management. If pro rata calculation was the last requirement for approval of a developer's project, action was required, and the pro rata calculation was escalated and completed.

In addition, there were approximately 200 approved pro rata projects distributed amongst five engineers who performed the pro rata calculations and maintained the documentation for their assigned projects. When engineers left the division, their pro rata files were transferred to another engineer to handle. There was minimal oversight and monitoring by Engineering over the status and condition of project documentation, the receipt of payments from subsequent developers, and payments made to initial developers. We found that the Accounting Division had not received any payment information for 97 (48.5%) of the 200 approved pro rata projects.

Also, the Engineering Division had not maintained an accurate comprehensive listing of all of the pro rata projects within the City. The most recent PU listing of pro rata projects kept by the Engineering Division was last updated on 7/6/2009. Additionally, discussions with several engineers within the division indicated the calculations performed to determine the amount of pro rata due to first developers was a complicated and time consuming process. The calculation process needed for each pro rata project could take up to 10 to 12 staff days (or 80 to 96 hours) per project to complete. This time did not include time engineers had to spend on their other normal project oversight responsibilities. The engineers also indicated that their team was small and did not have the resources to perform the calculations for the volume of approved pro rata projects.

Additionally, we identified the following conditions related to the process for handling pro rata projects:

- Use of connection fees to reimburse first developers created issues for the Accounting Division. Connection fees were collected over several years but were not always paid in the year the connection fees were collected. The Accounting Division did not know whether developers planned to be reimbursed by pro rata or connection fees at the time of pro rata was approved. This situation created accounting issues related to making payments across multiple fiscal years to the first developer.
- All pro rata projects were not flagged on the PU GIS layer, file folders had not been set up for all projects, and all project documentation had not been scanned into laser fiche. In addition, pro rata projects were not able to be flagged on the ACCELA system.
- File folders for pro rata projects were not kept in a central location.
- Engineering did not perform periodic quality control reviews on pro rata file documentation to ensure files were maintained consistently from engineer to engineer.
- There was no electronic means to track and enforce collections of subsequent development pro rata fees before plan approval was granted. Also, there were times when developers requested the option of paying their fees before utilities were activated rather than before plan approval. This needed to be tracked as well.
- The billing process for handling pro rata fees did not provide for proper segregation of duties. Engineers wrote notification letters for payment of pro rata fees, received

payments from developers, and processed fees they received. In the past, some developers paid in cash, creating additional risk.

- The pro rata billing process was a manual process rather than an automated billing process.
- Naming conventions for pro rata projects were not consistent from system to system and on physical documents. We observed pro rata projects that had project name changes from system to system.
- There were several instances where pro rata fees were billed to the subsequent developer and were not collected by the Engineering Division. The City had a fiduciary responsibility to collect pro rata fees on behalf of the initial developer. This situation could create a potential liability for the City for pro rata fees that were not collected.
- No follow-up process was in place when payments were not received.
- There were several pro rata projects that had been completed, but the first developers had not sent the Engineering Division their cost information. Therefore, engineers had to estimate the cost of the project so that subsequent builders could be billed for their pro rata share for the project. In addition, the division was collecting and holding fees on behalf of the first developer until they received the actual cost figures from the developer.
- Pro rata agreements did not include time parameter milestones for when specific documents were due and did not outline the consequences if milestones were not met. (For example, if cost figures for pro rata projects were not received within 90 days of project completion then all pro rata fees could revert back to the City). In addition, there was no sunset clause in place for the pro rata program; therefore, pro rata payments could be made for decades.
- Pro rata fee notification letters needed review and modifications. The letter stated that developers should forward cash or a certified check to the PU department to the engineer's attention, and no payment due date was indicated in the letter.
- The Engineering Division had not provided the Accounting Division with a complete listing of all approved pro rata projects.
- Lines of communication between the Engineering and Accounting Divisions related to pro rata payments were spotty even though the two divisions were interdependent on each other regarding the handling of pro rata payments.
- The Engineering Division did not always provide the Accounting Division the needed documentation to process payment transactions, which kept developers from receiving the payments timely.

These situations existed because policies and procedures were outdated. Engineering staff over the years had not grown in portion to the volume increase in the number of approved pro rata projects. The calculation process required to determine the amount of pro rata due the initial developers was a time consuming process, and the engineering staff could not perform the calculation process for the volume of pro rata projects as well as perform their normal project oversight responsibilities. Engineering

made the decision to make pro rata projects a lower priority for the division and did not provide adequate oversight and monitoring to determine the impact that their decision had on the pro rata program. Additionally, the communication between Engineering and Accounting was limited.

If these situations are not addressed, pro rata calculations will continue to be a burden on the engineering staff, and they will have a difficult time performing calculations for the backlog of pro rata projects needing calculations. Project documentation will remain incomplete, and receipt and disbursements of payments to developers will not be made timely. Finally, pro rata payments not being collected by PU may create a potential liability for the City, and the lack of internal controls, poor recordkeeping, and communications resulted in a high risk of monetary losses.

**Recommendation – The Engineering Division should strongly consider reevaluating their process for handling pro rata projects. The pro rata calculation process should be streamlined to become less time consuming. In addition, Engineering should provide additional oversight and monitoring over pro rata projects. Further, policies and procedures should be updated.**

We recommend the following items for consideration:

- Evaluate and determine if the pro rata program should remain in-house or be outsourced to a third party vendor. Points to consider include whether staffing levels in the Engineering Division can be adjusted to handle the volume of pro rata projects while also handling their normal project oversight responsibilities, whether the pro rata calculations process can be streamlined, and whether supporting documentation and financial records can be properly maintained.
- Consider benchmarking against other municipalities with similar pro rata programs.
- Consider having first developers declare how they want to receive their pro rata reimbursement fees at the time of project approval.
- Consider discontinuing offering connection fee reimbursements for the first developers and instead just offer developers pro rata and/or keep both pro rata and connection fees. The selection of connection fee reimbursements by first developers created accounting issues for the Accounting Division and Finance Department which needed to be considered as part of the evaluation process. The City Attorney should also be consulted.
- Ensure that all pro rata projects are flagged on the GIS layer, file folders are set up, laser fiche documentation is scanned, and pro rata projects are flagged in the ACCELA system.
- Develop and implement documentation standards for pro rata projects. After documentation standards are developed and implemented, file folders for all approved pro rata projects should be reviewed and updated by the assigned engineer to ensure that required documentation is complete for each project.

- Develop and implement the use of checklists of required documentation for pro rata projects.
- Develop a complete listing of approved pro rata projects.
- Keep pro rata files in a central location.
- Develop a quality control review process to ensure files are maintained consistently from engineer to engineer.
- Develop an electronic means to track and enforce the collection of pro rata fees before plan approval and/or before utilities activation.
- Ensure that billing processes for pro rata fees include proper segregation of duties.
- Develop an automated billing process for the payment of pro rata fees, or incorporate them into the PU billing system.
- Ensure a consistent naming convention for pro rata projects from system to system.
- Implement a pro rata collection process for the collection of pro rata payments from subsequent developers that includes adequate separation of functions.
- Determine and develop time parameters for developers to provide necessary project cost information to the Engineering Division and outline the consequences if items are not received. Additionally, consider reinstating the pro rata 10 year payment limitation (sunset clause) for the pro rata program (with City Attorney consultation).
- Develop a list of all pro rata projects that have been completed where the engineering division has not received the cost figures for the project. In addition, the division should follow up with these developers to obtain the information needed to determine the pro rata amount due them for their project.
- Develop a list of all subsequent developers that have been billed for pro rata fees and have not made their payments. The Engineering Division should follow up with these developers to determine why payments have not been made.
- Review and modify pro rata agreements and notification letters as deemed necessary for process changes.
- Improve communication between the Engineering Division and the Accounting Division.
- Provide the Accounting Division an updated copy of all approved pro rata projects.
- Provide the Accounting Division with needed pro rata payment documentation.

**Response - As a result of internal actions relating to the pro-rata program, working with the City Attorney's office, DPU staff committed in 2015 to fully evaluating and modifying the pro-rata program. It was recognized at that time that:**

- the engineering portion of the process was very labor intensive and time consuming;
- there was insufficient involvement from DPU's Accounting staff;
- the program had become difficult, if not impossible, to properly manage as it was currently structured; and
- the program objectives are excellent, it is the mechanisms that need to be modified.

**As a result of this realization, I specifically requested the Internal Audit team conduct a thorough review of the pro-rata program in our opening meeting. Having now received the evaluation from the Auditor, DPU is working on proposed revisions to the pro rata policy and procedure. Pro-rata is a City Council policy, and any changes must be formally approved by the City Council. The procedure may be revised by the DPU Director.**

**Thus, the pro-rata program is being fully reevaluated, with the following objectives:**

- Maintain the objectives, whereby the costs borne by a first developer are properly borne by subsequent developers.**
- Streamline the engineering evaluation portion of the process.**
- Ensure the Accounting team is fully involved in both development and execution of the program, in whatever form it takes.**
- Determine a method whereby the actions relating to a specific development can be considered completed and closed out.**
- If possible, add a mechanism for the Utility to weigh-in to increase infrastructure capacity beyond the immediate area's needs. For example, it is generally not considered fair for a developer to install a 30 inch water line, but there may be times when a 30 inch line is required as part of the overall water system. There is currently no mechanism to relieve the developer of the added cost of this larger pipe, and this cost either results in the required pipe size not being installed, the developer dropping the project, or the developer paying a much higher cost for installed infrastructure.**

**During the audit, DPU staff adjusted its process to incorporate many of the recommendations contained in the Audit Report. Additionally, while the long-term evaluation is underway, staff will continue to research to determine what actions, if any, were not captured in the documentation evaluated in the audit. Specific responses are addressed below, in the order they are stated in the report:**

- Engineering will include needed documentation in the revision of the pro rata procedure, as well as oversight, auditing and whatever else is needed.**
- There are 97 cases where no pro rata payments have been collected, nor costs reimbursed to the first developer. Some cases containing no payment information are valid, and no payment was ever received. There are also some cases where pro rata payment was not collected during the development process when it should have been. For these, staff is researching the cases and will collect the funds if able.**
- In addition to modifying the program, we believe that the staffing levels in the Engineering team remain insufficient to maintain the program in whatever form it takes. We intend to either hire temporary staff or contract out most of**

the catch-up work (as much of the work is not long-term sustained work). We are requesting the addition of one Engineer II to DPU Engineering staff to focus primarily on pro rata.

- Regarding the conundrum created by the timing of the developer's decision of whether to receive connection fee credits or pro-rata payments, this is a challenging question. Connection fee credit is more attractive to both the developer and, financially, the City. But the timing creates accounting challenges. We need to determine a method of tracking connection fees early enough in the process to meet the requirements of all involved.
- We are working with the Accela team to modify existing and creating new records in the eBUILD system. We are checking our pro rata files and are adding utility service areas to the GIS database. The goal we are working toward is making GIS and pro rata file folders consistent.
- File folders are now centralized and accessible.
- Quality control reviews are expanded and will be implemented with the revised pro rata procedure.
- There was a pro-rata check off in the old main frame software that stopped plat recordation for development projects. This allowed certainty that pro-rata payments were made when appropriate, before the development actions were recorded. There is a switch in eBUILD that will stop plan approval, but pro-rata has not yet been linked to this because pro-rata calculations are currently so far behind. Development and Permits has an executive override for the switch, and presently has the switch 'Off,' because calculation of pro rata significantly lags development plan approval.
- DPU staff will track when pro rata payment is deferred to activation of utilities.
- References to 'cash' have been removed from pro rata correspondence and agreements. Engineering and Accounting are working together to determine appropriate segregation of duties.
- Automation may work as a step to follow notification of pro rata owed. This appears to be another point where duties should be segregated.
- Developers frequently change project names. The same project passes through Planning, Development & Permits and DPU, all of which use a different protocol for project filing. The Planning Department organizes their project files by a number referencing the year & the type of application. Development and Permits Engineering determines project names in the files (electronic & physical). Development and Permits also assigns a project number used in Accela and other files. They use the project number (AC number) for file organization. DPU organizes projects alphabetically by project name. When the developer changes a project name (often at the City's request), we leave a reference to the new name in the databases we use (Laser Fiche, file folders), so that a name change does not confuse someone searching for a specific project. At the new name, we also leave a back

reference to the old name. DPU also keeps a project list with cross-reference data.

- First developers cannot receive reimbursement until providing complete cost data; however, this does not relieve DPU of the duty to collect pro rata payment from subsequent developers. The policy, procedure and agreements provide for collection of estimated pro rata, with a final amount to be determined when cost data is received. Most developers provide the information willingly, since they are due reimbursement.
- The auditor, with a background in accounting & finance, and DPU Engineering have a fundamental philosophical difference about pro rata payment from a subsequent developer. The auditor thinks of pro rata as a bill the developer owes to the Utility. Once the notice is sent, the thirty-day clock starts ticking, and interest & penalties will accrue until the money is tendered. Non-payment will result in legal action. Early payment may result in a half-percent discount on the bill.
- The subsequent developer is responsible to pay the pro rata owed when he is ready for plan approval, plat recordation or activation of utilities (setting of water meters). These are all significant events for the developer, providing plenty of motivation. Adding a requirement to pay within a time period does not fit the intent nor application of pro rata, which is primarily a development tool. The developer does not actually owe any money until he is using the facility. State code and City code talk about the developer paying a share of the facility cost based on his pro rata percentage of flow through the facility. Charging earlier is not appropriate.  
However, this position does not preclude other controls. We will develop a method of tracking pro rata owed notices, to ensure appropriate collection. The eBUILD system contains a record type for pro rata payment and ties the payment to the developer's project. The Accela database should work for gathering pro rata owed notices for various developers. We concur that we must track subsequent developer notification letters versus payment, and plan approval/ utility activation.
- For first developers, we could add a time limit (90 days) with some penalty for failure to provide detailed cost data for new pro rata facilities. However, most developers are glad to provide the project cost data because they are eligible to receive reimbursement money once the pro rata calculation package is complete. The detailed costs are required before any reimbursement to the first developer. DPU staff believes changing the pro rata policy and procedure for reversion of funds back to the City would receive significant opposition from the development community. This would also remove motivation for developers to continue to work in Chesapeake. DPU recommends against such a penalty.

- **The sunset clause was struck from the original policy and procedure in 1997 based on a City Attorney opinion that was recently reaffirmed. The City is the only entity able to manage a pro rata system extending over decades. Full development of pro rata utility service areas normally extends over many years, and will likely span several decades. If the first developer opted to receive reimbursement in the form of connection fees, then the only way for the Utility to recover those fees is to collect the pro rata over years from the subsequent developers.**
- **The pro rata notification letters have been revised to remove reference to cash payment. The revised letter templates have been filed in a common 'Go-By' folder on the Shared Drive for all to use. DPU Engineering staff have been advised that we will not accept cash payment.**
- **All information is being shared between DPU Engineering and DPU Accounting. This is probably the number one improvement related to the pro-rata program made to date.**
- **DPU staff is evaluating all pro-rata projects to determine what information has not been received and what actions have not taken place, including, but not limited to:**
  - o **Cost data not received from first developers; and**
  - o **Bills for amounts due not provided to subsequent developers.**

## **2. Pro Rata Accounting**

**Finding - PU revenue reflected on the City's Comprehensive Annual Financial Report (CAFR) had been overstated and liabilities understated for numerous years. Subsidiary records for pro rata projects had not been kept up to date and had not been reconciled to the general ledger. Also, the Accounting Division did not have a complete understanding of the pro rata project process. Communication between the Engineering and Accounting Divisions was limited even though the divisions were dependent on each other to ensure proper accounting for pro rata projects. Further, accounting policies and procedures for the handling of pro rata payments and disbursements needed to be updated.**

The PU Accounting Division was responsible for maintaining the pro rata financial information for all pro rata developers. The financial information and processes required for the PU Accounting Division should include the following:

- Receipt of pro rata notification letters from Engineering
- Receipt of developers reimbursement agreements (pro rata vs connection) from Engineering
- Maintaining subsidiary ledgers for each first developer pro rata project with the total amount of pro rata due to first developers

- Posting payments received from subsequent developers to initial developers subsidiary ledger
- Processing payment requests received from Engineering
- Posting disbursements made to first developers to subsidiary ledger
- Processing pro rata payments and disbursements to liability general ledger accounts
- Transfer disbursements for connection fees from the connection fee revenue account and to a connection fee liability account
- Reconciling subsidiary ledgers to general ledger liability account balances monthly
- Maintaining a pending file of requests for payment notification letters received from Engineering.
- Obtaining a listing of all approved pro rata projects from Engineering Division.
- Periodically reviewing pending file of notification letters with Engineering for payments that have not been received.

Our review of the accounting records reveal that all pro rata payments received were recorded as revenue rather than as a liability on the general ledger. Therefore, revenue indicated on the CAFR for PU was overstated and that liabilities were understated. The overstated amount of revenue could not be determined due to the poor condition of the financial records for the pro rata projects. For fiscal years 2006 to 2015, there were \$2,502,890 (cash basis) in disbursements for pro rata, sewer, and water connection fees that were distributed to pro rata developers. In addition, there was \$967,959 net credit in payments that had not been distributed to developers for fiscal years 2006 to 2015. The Accounting Division was in the process of reconstructing the financial records for fiscal years 1999 to 2016.

PU accounting responsibilities were predicated on the Accounting Division receiving the necessary documentation from the Engineering Division to properly maintain the financial records; therefore, the Engineering and Accounting Divisions were dependent on each other to ensure financial records were kept current. Our review of the records and discussions with Accounting and Engineering staff indicated that there was a lack of communications between the previous division managers. The Accounting Division did not always receive the supporting documentation needed from the engineers to process the financial transactions that occurred and the Accounting Division did not routinely follow-up with engineers to receive the needed documentation. Therefore, the financial records were not properly maintained. Also, we found that the Accounting Division did not have a complete understanding of the pro rata program, which hampered the maintenance of the financial records and the proper treatment of the receipts and disbursements.

In addition we noted the following:

- Policies and procedures for the handling of pro rata projects for the Accounting Division were not being followed. In addition, the policies and procedures had not been substantially updated since the program's initiation in 1984.

- Pro rata payments received from subsequent developers were being processed to a pro rata contribution revenue account (1416080806) rather than a liability general ledger account. In addition, disbursements to the initial developers for pro rata were being process to a contra revenue account (1416080809) rather than a liability account.
- Payments received for water and sewer connection fees were being processed to two general ledger revenue accounts (1416080701 & 11416080601) respectively. When payments were disbursed they were paid from two contra revenue pro rata general ledger accounts (1416080709 & 1416080609) respectively. It should be noted that when connection fees were received by PU, these fees became a liability. Also, connection fee payments were often collected over previous years and disbursed to initial developers in a later year.
- Accounting Division discontinued posting payments, disbursements, and the pro rata amount owed the initial developer to their manual subsidiary ledgers in 2006. Therefore, subsidiary records were not kept current and did not provide accurate financial information for each pro rata project.
- Subsidiary records had not been reconciled to the general ledger.
- There was no electronic means established to track pro rata amounts owed to initial developers, incoming payments from subsequent developers, disbursements to initial developers, and the remaining balance owed to the first developer.
- Accounting Division did not have a complete listing of all approved pro rata projects.
- Accounting Division was not familiar with the Virginia Unclaimed Property statute. There may be situations in the future where developers have gone out of business, died, or could not be located to pay them their pro rata fees. These fees would become unclaimed property and would have to be escheated to the state.

This situation existed in part because previous PU senior engineering and accounting management had not updated and maintained oversight and monitoring for the handling of pro rata projects. Policies and procedures were antiquated and needed to be updated. Accounting Division management did not have a complete understanding of the pro rata process. Communication between engineering and the accounting division was strained. Pro rata payments were processed as revenue instead of a liability which caused revenues to be overstated and liabilities to be understated. In addition, subsidiary records had not been maintained since 2006.

If these situations are not addressed, the possibility exists that developers could be overpaid or underpaid. Revenues would continue to be overstated and liabilities understated which could affect external audit opinions and bond ratings. The lack of accurate pro rata financial records and subsidiary records and the fact that the financial records had not been reconciled created a significant risk of losses. Additionally, the lack of complete and accurate pro rata financial records could cause future legal issues.

**Recommendation – Incoming pro rata payments should be posted to liability accounts verses revenue accounts. Subsidiary records should be kept up to date and be periodically reconciled to the general ledger. The Accounting Division should have a complete understanding of the pro rata process. The lines of communication between the Accounting and Engineering divisions should remain open at all times. In addition, pro rata policies and procedures for the Accounting Division should be updated and followed.**

PU should consider the following:

- Due to the condition of the financial records for pro rata projects, the amount of time it would take to update the financial records, and the limited resources of the Accounting Division, PU should consider outsourcing the reconstruction of the pro rata financial records or obtain resources from other departments to assist in the cleanup effort. The end results of the reconstruction efforts should include the following financial information for each first developer: pro rata amounts owed to initial developers, the date and dollar amount of incoming payments from subsequent developers, disbursements to initial developers, and the remaining balance owed to the initial developer. The reconstruction period of the financial records for pro rata projects should cover 1998 to the present.
- Develop appropriate accounting processes that cover the initial builder's selection of connection fee payments rather than pro rata payments.
- Once a decision is made on how PU management will be handling future pro rata projects, the Accounting Division should determine the proper accounting for the old and the new pro rata programs.
- Obtain a complete listing of pro rata projects from the Engineering Division.
- Reconcile the listing of pro rata projects to the subsidiary records to determine if accounting has documentation for all projects. Follow up with Engineering for a status report on those projects that do not have any accounting records.
- Establish an electronic means to track pro rata amounts owed to first developers, incoming payments from subsequent developers, disbursements to initial developers, and the remaining balance owed to the initial developer.
- Become familiar with the Virginia unclaimed property statute in case it is needed in the future.

**Response - PU Engineering and Accounting have worked together a great deal to increase the combined teams' understanding of the pro rata process. Whereas Accounting was minimally involved in the program since its inception, that has changed, and they are now integrally involved in the process.**

**PU Accounting has computerized the financial records that were available via the engineers' pro rata project files. The Department is in the process of hiring an external firm to perform an accounting review of these electronic records and provide reconciliations of engineers' project files to the City's accounts and records. After the review, the pro rata liability for the period ending June 30, 2016 will be determined. Future financial and internal controls will be implemented after the pro rata business processes have been updated. At a minimum, monthly, quarterly and annual reconciliations will be required as well as timely escheat filings.**

**Accounting treatments of the pro rata program were reviewed annually by the City's Finance Department and the City's external financial auditor. No recommendation was made to change the accounting and financial reporting of the pro rata related receipts and disbursements. Changing the accounting practices of how these payments are handled is, in effect, a change in accounting treatment for this program.**

## **D. Maintenance and Operations (M&O)**

Our review of the M&O Division noted that the water meter section of the M&O Division had not tested all large meters once each year as required. Also, water meters over 15 years old had not been replaced as recommended. In addition, refurbished meters were not being returned into Maximo inventory records after repairs were completed. Further, documented policies and procedures were lacking in all three of the areas addressed. The underlying cause for meter testing and replacement not being performed as required was insufficient staffing.

### **1. Aging Meters**

**Finding – The M&O Division had not replaced all aging residential (5/8” to 2”) water meters which were over fifteen (15) years old as recommended. In addition, the fifteen (15) year guideline was not documented in the division’s policy and procedures.**

The Division’s fifteen (15) year meter replacement program guideline was based on various studies performed by other municipalities that were provided to American Water Works Association (AWWA) in various case studies. In addition, aging meters become less accurate, causing revenue to be lost because the consumption of water was not being completely recorded. PU had the burden of determining economic optimum age for meter replacement.

Our review of the Customer Information System (CIS) database for water meters revealed that there were 17,311 residential water meters that were over 15 years old that had not been replaced. This was 29% of the approximately 60,000 residential meters in the City. By not replacing aging meters over 15 years old, PU was subject to a potential revenue loss. A case study in the Water & Wastes Digest titled “Determining Economical Optimum Life of Residential Water Meters” calculated the accuracy loss for aging meters 15 years and older in five (5) year increments. Using this model the calculated potential revenue loss in the City was \$602,809. The total estimated cost to replace all of the aging meters in the City would be \$1,292,440. Thus, using this model, it would take approximately two years to cover the cost of replacing all 15 year old meters over 15 years old. The City also had 5,493 residential meters over 25 years old, and 368 meters over 40 years old with the oldest meters dating back to 1967. Details for our calculations are shown below:

**Exhibit #4  
Residential Meters Over 15 Years Old as of 3/3/16**

<b>Aging Meter Range Over 15 Years</b>	<b>Accuracy Loss Percentage of Meters</b>	<b>Number of Aging Meters Over 15 Years Old</b>
Over 30 Years	18.4%	2,389
25 to 29 Years	4.2%	3,104
20 to 24 Years	1.0%	7,234
15 to 19 Years	.06%	4,584
<b>TOTAL</b>	<b>5.92% Average.</b>	<b>17,311</b>

**Assumptions for calculating revenue loss:**

1. Average bill per cycle (every 60 days) is \$150.00 or \$900.00 (per year)
2. Accuracy loss percentage for meters over 15 years old (included in Exhibit 4)
3. There was a potential revenue loss in not replacing aging water meters that were over 15 years old

**Exhibit #5  
Annual Loss of Revenue by not replacing meters**

<b>Aging Meter Range Over 15 Years</b>	<b>Calculation</b>	<b>Annual Amount of Lost Revenue</b>
Over 30 Years	2389 Meters X \$900 annual billing X 18.4 % meter accuracy loss =	\$395,618
25 to 29 Years	3104 Meters X \$900 annual billing X 4.2 % meter accuracy loss =	\$117,331
20 to 24 Years	7234 Meters X \$900 annual billing X 1.0 % meter accuracy loss =	\$65,106
15 to 19 Years	4584 Meters X \$900 annual billing X .06% % meter accuracy loss =	\$24,754
	<b>TOTAL Annual Revenue Loss for Meters Over 15 Years Old</b>	<b>\$602,809</b>

**Assumptions for calculating cost of replacing aging meters:**

1. Replace 100% of Residential meters over 15 years old (indicated in above Exhibit 4)
2. Cost per new residential meter is \$40.00
3. It would take two dedicated crews (six employees), two years to replace
4. Approximate cost for labor to install new meters is \$300,000.00 per year (based on M&O Supervisor's estimated labor cost)

**Exhibit #6**  
**Total cost to replace meters over 15 years old Table**

Calculation	Total Cost
17,311 meters X \$40 meter cost	\$692,440
Estimated labor cost for two years	\$600,000
Total cost to replace 17,311 meters	\$1,292,440

In addition, the Water Service Section of the M&O Division had 20 positions of which nine were vacant and five were filled with temporary employees. A factor in the vacancies was the competitive salary levels between various municipalities. City salaries for these vacant positions was \$3,000 to \$3,700 lower than those at other municipalities. Further, as the number of housing developments had grown in the City, the size of the M&O staff had remained the same. This section had a continually high vacancy rate. At the time of our audit there was a 45% vacancy rate, not including the five temporary staff. The staffing situation was a contributing factor in meters not replaced as recommended. Also, automated systems such as the CIS system were not used by M&O management to determine the most efficient way to replace the meters. M&O management used spreadsheets to determine what meters needed to be replaced and in what order.

These situations occurred because there was insufficient personnel to perform meter changes, the meter change out program was under funded due to budget cuts, and there was uncertainty as to which meter technology would be used in the future. If this situation is not addressed, the accuracy of aging meters will diminish, water and sewer revenue will be decreased, and customer service calls will increase as the meters wear out. In addition, if the personnel situation continues, the Water Service Section will not be able to maintain timely completion of daily work orders, adversely affecting the quality of customer service to citizens.

**Recommendation – PU should develop and implement a realistic residential meter replacement program. Additionally, PU should consult with Human Resources to evaluate the cause of the continual vacant positions in the Water Service Section of the M&O Division and develop a plan to mitigate the continual vacancy issue. Further, meter replacement policies and procedures need to be documented.**

PU should consider the following items:

- Change the current 15 year meter replacement plan. Consider replacing meters every 20 to 25 years.
- Make a concerted effort to replace all residential meters over 25 years old as soon as feasible.
- Incorporate the CIS system into the determination process of which meters to be replaced and in what order.
- Work with Human Resources to determine appropriate salary levels in the Water Service Section.

**Response - Public Utilities concurs on the need for a realistic residential water meter replacement program and such documented policies and procedures. Public Utilities is requesting several additional positions over the next three year budget cycle to assist with the meter replacement program. As resources become available, PU will continue to replace broken water meters and those over 25 years old as first priorities. Expansion of the Automatic Meter Reading (AMR) program throughout the City may also dictate the order in which meters are replaced.**

**In addition to following American Water Works Association guidelines, PU will create (as necessary), update, and maintain policies and procedures for meter replacement. Based on a March 2016 internal test of ten random residential meters that were 17 - 44 years old, PU calculated an overall accuracy percentage of 96.55%. This indicates that meter accuracy for aging meters in Chesapeake may be better than that reflected in Exhibit #4, and the annual loss of revenue by not replacing meters is less than that forecast in Exhibit #5.**

**The Director currently meets with Human Resources department representatives monthly to discuss personnel issues of all types. The difficulties in attracting and keeping entry level employees has been a topic of discussion over the last year, and we will continue to work on this issue.**

**The modernization of the M&O facility will also assist with aging meters. An up-to-date facility will make testing, storage, and issuance of meters more efficient, and it will be more attractive to new employees, helping us to compete in the workforce.**

## **2. Large Meter Testing**

**Finding – The M&O Division had not consistently performed annual testing of large (3” to 10”) water meters. In addition, the annual testing process was not documented in the division’s policy and procedures.**

Public Utilities determined that large meters (3” or larger) would be tested annually. An AWWA publication, “Water Meters – Selection, Installation, Testing, and Maintenance” M6, indicated that a survey of the largest utilities in the United States had determined that the testing period for larger meters should be done on a yearly basis.

We noted that there were 799 large meters that needed to be tested each year. The Water Services Section indicated that the large meter testing cycle was taking 30 months to complete and they were unable to complete the testing of all large meters annually as required. Large meter customers were high volume users of City water, therefore, the testing of meter accuracy for large meters should be a high priority as inaccurate meter readings could impact PU with substantial losses of revenue.

Our tests of large meter testing documentation revealed the following:

- There were 474 revenue meters and 325 fire meters.
- The Water Services Section tested 251 of the 799 meters during the year.
- A total of 548 (68.6%) of the 799 meters had not been tested.
- 305 (64.3%) of the 474 “revenue” meters had not been tested for more than one year. The exhibit below indicates the number of large meters that were not tested in the current year.

**Exhibit #7**

Timeframe	Number of Large Revenue Meters
1 years overdue	65
2 years overdue	74
3 years overdue	45
4 years overdue	80
5 years overdue	20
6 years overdue	8
7 years overdue	4
8 years overdue	5
9 years overdue	2
10+ years overdue	2
<b>TOTAL REVENUE METERS OVERDUE</b>	<b>305</b>

Discussions with Water Service management and a review of water meter testing records revealed the following issues:

- Water services management maintained a listing (spreadsheets) of all large meters that needed to be tested. However, scheduling for the testing of large meters was assigned by geographical area (i.e. Greenbrier, Western Branch, Great Bridge, etc.) rather than by date of last test performed.
- Large meter testing dates were entered in the CIS and Maximo systems but PU did not utilize system generated testing date information on the CIS or Maximo systems to perform their large meter testing.
- Testing dates indicated on the CIS system were incorrect and indicated numerous default testing dates. There was no quality control process in place to ensure the data entered into the two systems were accurate.
- The CIS and Maximo systems did not communicate with each other; therefore, testing dates for large meters had to be entered manually into each system.
- Staffing levels of the water meter service section had not kept up with the growth in the number of large meters located in the City.
- CIS system data for determining when large meters needed to be tested was not being utilized.

- Automated software was not being used to determine the most efficient route to be used to perform large meter testing.
- Actual time spent on a task such as travel, obtaining supplies, and planning/preparing the task was not documented in Maximo. This information would assist management in justifying the need for more resources. When added to the time spent actually testing the meters it would give a more accurate time per each job.

These situations occurred because policies and procedures had not been documented. Large meter testing was not being scheduled by testing date. Manual records were maintained rather than using system generated testing information to determine what meters needed to be tested. There was no quality control process in place to ensure the accuracy of data entry. Additionally, staffing levels of the water service section had not kept up with growth in the number of large meters in the City.

If these situations are not addressed, the accuracy of aging meters will diminish, which could have a negative impact on PU's revenue stream. If staffing levels are not improved the Water Service Section will continue to not meet their goal of testing large meters annually as required; this in turn could adversely affect the quality of service provided to citizens.

**Recommendation – PU should develop and implement a large meter testing program that can be accomplished with the staffing level of the Water Service Section. Additionally, the Department should consult with Human Resources to evaluate the cause of the continual vacant positions in the Water Service Section and develop a plan to mitigate this issue. Further, large meter testing policies and procedures need to be documented.**

PU should consider addressing the following items:

- Perform large water meter testing within a year from the last completed test date.
- Develop and implement a quality control process to ensure information that is entered into CIS and Maximo is accurate.
- Determine if an automated process can be placed into CIS system that can calculate the test dates for each new meter that is entered into the CIS system.
- Consult with the IT department to determine if they can get CIS and Maximo to interface to eliminate the duplicate data entry.
- Eliminate the use of spreadsheets for tracking large meter testing information. The sheets can be kept for historic references.
- Use CIS to determine testing dates for large meters.
- Consider obtaining an automated routing system to set up routes to be used to perform meter testing.

**Response – Currently Public Utilities has over 800 large meters (> 2”) that are tested by two staff members in Water Services. These two staff members also perform**

other duties including large meters repairs, register or touchpad repairs, 1½” - 2” meter change-outs, special meter tests, and numerous large meter re-reads. With current staffing, and as commercial development continues to grow, PU will be unable to meet the goal of testing large meters annually. Public Utilities is requesting an additional two positions over the next three year budget cycle specifically to assist with large meter testing. To annually test approximately 800 large water meters, two 2 man crews would be needed.

Recognizing that we are unable to test all meters annually as desired, the meter testing crew has been performing tests by boroughs rather than age, in order to increase efficiency. Public Utilities created a list of all meters that had not been tested in 4 years or more, as referenced in Exhibit #7. Many of these non-tested meters are in the process of being checked currently to reduce these numbers to a more manageable level. PU will continue to investigate all large meters and determine any issues and make recommendations or take necessary actions as required.

Although we are not meeting the goal of testing all large meters annually, a large amount of meters that we have tested beyond the one year mark have met AWWA standards without having to replace or repair them. AWWA has no real recommendations as to when large meters are to be replaced. Public Utilities’ process is to maintain the current inventory in place as long as the meter is running accurate (within AWWA guidelines) and as parts are still available. If we cannot repair or refurbish the meter, then the large meter is replaced.

Vacancy levels in Public Utilities’ Water Services section have remained high for several years. The low salary for laborious work performed in this section is thought to attribute to vacancy levels. Temporary employees have been used to fill entry level positions. While temps have helped somewhat in filling the void, we have only been minimally successful in hiring and retaining these employees as full time city staff. Public Utilities will continue to meet monthly with Human Resources’ representatives to discuss continuing vacancies and retention of employees. In addition, an up-to-date facility will be more attractive to new employees, helping us to compete in the workforce.

Public Utilities concurs on the need for a written policy and procedure for large water meter testing and will continue to work on updating and adding policies and procedures. To perform some of the recommendations by this audit, CIS & Maximo will need to be integrated or some type of new program may need to be implemented with the assistance of the IT department. Additional personnel, equipment and tools are needed to have a successful large meter testing program.

### 3. Meter Tracking

#### Finding – The Meter Shop did not have written procedures for tracking new and refurbished meters.

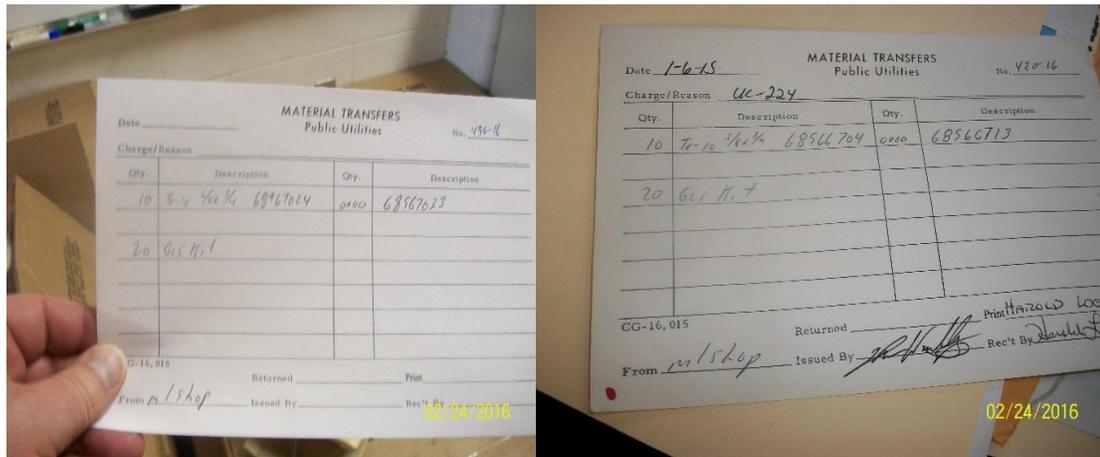
An effectively functioning internal control process should incorporate the following attributes:

- Documented policies and procedures
- Management oversight of the program
- Performance of periodic independent checks of the process
- Ongoing monitoring of the program
- Development and utilization meaningful management reports

The Meter Shop had no written procedures for managing and tracking meters. Instead it relied upon the institutional memory of long-term staff to track the status of new and existing meters. It also extensively used a paper trail that required manual entries for meter inventories, meter transfers, and work order usage. These manual entries were completed on a monthly basis.

- The Meter Shop Supervisor recorded the meters issued to work crews on a paper routing slip. This routing slip was filed until the information was entered to Maximo. Additionally, the “Material Transfers” sheets were hand-numbered, but were not consistently used in sequential order. (Note the “red dot” at the bottom left corner in Exhibit #8 – it indicated that the form had been entered into Maximo.)

**Exhibit #8**



- Work order meter usage information was updated on Maximo, but then a duplicate entry was required for the CIS system.

In addition, meters that were removed from customers' locations were noted in both CIS and Maximo. These meters were then evaluated for refurbishment. The Meter Shop refurbished the selected meters by cleaning and repairing them as necessary, then meter accuracy was tested. Although these meters were viable, the M&O Division did not use them because Maximo did not allow use of refurbished meters in its work orders. Therefore, refurbished meters were transferred to the Customer Service Division which put the meters to use and entered them into CIS, since they used CIS as their work order system. However, there was no centralized inventory maintained for these refurbished meters other than documentation related to their refurbishment. Exhibit #9 shows documentation for the repair and testing process.

### Exhibit #9

City of Chesapeake Department of Public Utilities						METER REPAIR									
Date	Size	Make & Type	Number	Rdg.	Remarks	Make	Size	Date	Number	Rdg.	15 gpm	10 gpm	7 1/2 gpm	1 1/4 gpm	Remarks
4/11/16	3/4x3/4	Hersey	10174586	0394	clean	1-10	2x2	8/21/16	68966733	0000	100	98	99	99	
			12045415	0188	clean				68966741	0000	100	100	99	99	
			12046555	0132	clean	Hersey	1"	11	3247888	0010	100	97	99	99	
			12046600	0153	clean				4090363	0000	100	100	100	100	
		Tr-10	53119730	0197				7/7/16	4090393	0000	100	96			Failed Test
			53119400	0056					13198094	0000	100	101	101	101	
			93120030	0173					2045813	0188	100	100	100	100	
		Tr-10	11051874	0154					14196205	0100	100	100	100	100	
		Hersey	10057063	0152					3198028	0118	100	100	100	100	
			11050580	0002					4090391	0100	100	100	100	100	
									3197953	0100	100	100	100	100	
									14091206	0021	100	100	100	100	
									3198244	0007	100	100	100	100	
									14090370	0001	100	100	100	100	Failed Test
									13198067	0200	100	100	100	100	
									1277508	0100	99	101	100	99	99

This lack of written procedures resulted from a reliance on institutional memory by Meter Shop staff. Also, the failure to track refurbished meters in Maximo occurred because staff did not use placeholders within the Maximo inventory feature.

If these practices continue, the risk exists that valuable information would be lost with staff turnover. Public Utilities would be required to redevelop processes for documenting the history of each meter, and testing the process against the idiosyncrasies within the Meter Shop. Additionally, the failure of tracking refurbished meters means PU did not have an effective tool to monitor the savings generated.

### Recommendation – The Meter Shop should develop written procedures for tracking new and refurbished meters.

The written procedures should document the monthly entries while attempting to streamline the required manual entries where possible. Also, PU should develop an inventory and tracking process for the refurbished meters in both Maximo and the CIS.

**Response – PU currently does not have a specific written procedure for tracking meters, but meters are tracked. All new meters purchased by the City are entered into the Customer Information System (CIS), which maintains the key meter information by individual meter number. The physical location of meters are also documented within CIS, as well as the meter number tied to that location. Large batch purchases are entered into CIS by the IT department. Meter purchases for meter sizes larger than residential meters are entered manually in CIS by the Meter Shop Supervisor. Maximo, which is used for work orders, contains meter location and number, but requires a search by address, as meter information in Maximo is not updated due to limited staffing and the fact that it is not absolutely necessary.**

**New meters are issued to both Customer Service and M & O divisions of PU. Currently, refurbished, lead-free water meters from M & O are only used by Customer Service and tracked in CIS. Maximo is unable to track refurbished (used) meters at the current time; therefore, M & O does not use or track them. Pending funding, Public Utilities will work with IT to develop a module/upgrade in Maximo to allow for the tracking of revolving inventory.**

**Public Utilities concurs that water meter policies and procedures need to be documented. Currently two divisions handle water meter tasks. The consolidation of all staff involved in water meter tasks is currently being evaluated.**

**To maintain meter information as recommended by audit, additional staff would be necessary to maintain tracking in a more efficient and productive manner. Any programs or software changes would also require funding to implement and assistance from the IT department.**

#### **4. Inventory Process**

**Finding – PU’s inventory process was cumbersome, lacked adequate segregation of functions, and inventory counts in Maximo were not always accurate.**

Government Accountability Office, EXECUTIVE GUIDE, Best Practices in Achieving Consistent, Accurate Physical Counts of Inventory and Related Property, GAO-02-447G, states, “Accurate and reliable data are essential to an efficient and effective operating environment in the private sector as well as in the federal government. Inventory represents a significant portion of assets in the federal government and private sector. Therefore, managers and other decision makers need to know how much inventory there is and where it is located in order to make effective budgeting, operating, and financial decisions and to create a government that works better and costs less.” Public Utilities and several other City departments used the Maximo system to maintain their inventories.

In reviewing inventory practices in PU, we noted the following:

- Data entered was available to various City departments, and any user assigned to that storeroom had the ability to delete or change records within the assigned storeroom.
- The “current balance” value in Maximo was adjusted after the annual year-end inventory count to match what was counted in the bin.
  - PU storekeepers attempted to conduct periodic inventory spot checks, but the counts were not maintained, and lacked comments or explanations of variances.
  - We conducted a surprise inventory count and found several items had different bin counts than was shown in Maximo. The differences included both overages and shortages.

**Exhibit #10**  
**Examples of Inventory Differences**

<b>ITEM NUMBER</b>	<b>DESCRIPTION</b>	<b>4/5 Maximo balance</b>	<b>4/6 surprise inventory count</b>	<b>4/7 Maximo balance</b>	<b>Difference</b>
105387	TRIMMER LINE FOR WHEELED GAS TRIMMER .155 #10L387	10	11	10	1
15522	8 INCH, EBAA MEGALUG RETAINER GLAND FOR D.I. COMPLETE	6	7	6	1
167	BAR & CHAIN OIL (GALLON) CA17406	2	3	2	1
22174	HAND CLEANER, KRESTO EF, STK#87044, 67- 84 FL.OZ.	4	0	4	-4
261656	CUTLER HAMMER STARTER # AN16KNOA (REPLACEMENT FOR # 10ENO & ANn16KNO)	6	8	6	2

ITEM NUMBER	DESCRIPTION	4/5 Maximo balance	4/6 surprise inventory count	4/7 Maximo balance	Difference
26553	RAINSUIT SIZE 4X-LARGE, #1FBB2	21	23	21	2
27721	SAFETY VEST 2 XTRA LARGE V+AM-C3GDK-L- XXL (LAKELAND) CLASS	7	1	7	-6
401166	PROTECTO 401™ CERAMIC EPOXY LINED 6 INCH MJ TEE SSB DI/CI 350	7	3	7	-4
461612	V BELT BP46	4	5	4	1

- PU' storekeepers maintained the bulk of the inventory in a warehouse and outside area located off Executive Blvd at the M&O site. When an item was received, the storekeepers entered the receipt into City's PeopleSoft financial system and also entered it into Maximo because there was no direct communication between PeopleSoft and Maximo. Storekeepers placed requisition requests in PeopleSoft, then placed duplicate requisition requests in Maximo.
- Storekeepers were also responsible for issuing items, updating Maximo, conducting storeroom inventories, and contacting vendors for delivery of parts and/or services. Therefore, they were ordering, receiving, and maintaining inventories with minimal separation of duties.
- The PeopleSoft and Maximo entry processes required scanning of supporting documentation. The processes had to be done separately, thereby doubling the work.
- A previous update to Maximo caused the loss of several different inventory fields and their contents. For example, data was lost indicating date of last items received and issued. The loss of data on these fields hampered timely review of obsolete and useless inventory.
- When an invoice was received by Public Utilities' Accounting Division, it was routed to the Storekeeper for verification, then routed to a Division Head for approval prior to being processed for accounts payable. This method relied upon the City's interdepartmental mail system and PU routing methods; neither were designed for same day delivery.

These situations occurred for multiple reasons: the City's decision to have open architecture for user permissions instead of a defined audit trail recording user activities during the selection and implementation of Maximo allowed bin count value changes without an audit trail. Additionally, duplication of work resulted from Maximo's inability to directly communicate with PeopleSoft. The separation of duties was limited due to staffing levels. If these conditions continue, the reliability of the inventory information will be reduced, and loss of inventory could result.

**Recommendation – PU should take steps to streamline inventory processes, improve segregation of functions, and improve inventory accuracy.**

Items to be addressed should include:

- Working with IT to improve control over Maximo inventory controls
- Conducting periodic inventory spot checks, and maintaining comments or explanations of variances.
- Working with IT to reduce the need for duplicate system entries.
- Improving segregation of duties within the storekeeping function.
- Working with IT to develop a means of tracking obsolete inventory.
- Using an automated method to improve the invoice approval process. They may be able to use a process being developed by Public Works.

**Response - In March 2016, PU added a new Accountant I position to compliment staff, specifically to improve the separation of duties with M&O purchasing and warehousing functions. The position has been filled and the selected candidate works at the M&O facility adjacent to the storeroom and yard storage areas. A Separation of Duties matrix was developed and initiated in late March 2016 to differentiate storeroom and accounting responsibilities.**

**The Accountant I participates in the ordering of materials and performs periodic checks of inventory. This assures separation of duties and documentation of any variances observed. The Accountant I will also be assessing methods to improve control over Maximo inventory and streamlining the process between the M&O field site and the PU Accounting group at City Hall. PU will continue to work with IT to reduce the need for duplicate system entries and the integration between Maximo and PeopleSoft and to develop a means of tracking obsolete inventory. PU is currently testing an automated, paperless method to improve the invoice approval process.**

**The Storekeeper Supervisor along with several other PU employees participate in the Maximo User Group meetings. There are ongoing discussions regarding possible upgrades to the system to integrate with other systems such as CIS and PeopleSoft.**

**The modernization of the M&O facility will assist with the inventory process. An up-to-date facility will have the proper design for storage of materials inside the warehouse and outside storage for large items such as piping and bulk materials (sand, stone, topsoil, etc.).**

## **5. Data Entry**

**Finding – The Water Services and Water Distribution Superintendents spent significant time performing data entry work.**

According to the job description for the Water Service Superintendent, the position: “Supervises staff, including selecting or recommending selection, training, assigns and evaluates work; counsels, disciplines and terminates or recommends termination.”

Similarly, the job description for the Water Production Superintendent states:

“Supervises subordinate personnel, including training, scheduling, assigning, and evaluating work.”

Although the Water Services Superintendent was responsible for “data entry of work orders” and both positions were responsible for “other related duties as assigned” their primary responsibility was staff oversight.

The PU CIS and Maximo did not directly communicate with each other. Because of that lack of direct communication, work order history from CIS had to be manually entered into Maximo. Due to staff vacancies, the Water Services Superintendent and Water Distribution Superintendent were the primary persons handling this duplicate data entry and inputting the staff labor and costs. This task accounted for several hours in each of their work days.

We also identified a paper folder of open work orders from 2008 and 2009 which had no indication of status of completion. These 2,000-plus open work orders had not been translated after of an upgrade to Maximo from the City’s mainframe system. Water Services selected a batch to review, then verified each work order against CIS and Maximo for completion. Those old open work orders that had not been completed were then assigned to work crews and addressed without incident.

These situations occurred because of lack of staff for data entry as well as lack of resources during the Maximo upgrade processes. However, using Superintendent level staff to perform data entry for extended periods of time is a poor use of resources. Additionally, work orders overlooked during upgrade processes can potentially result in citizen complaints or even safety issues.

**Recommendation – PU should take steps to reduce the time necessary for performing data entry work.**

In the short term, filling staff vacancies should help reduce the amount of time spent by the Superintendents on data entry. However, ideally, the best solution is to improve the interface between the CIS system and Maximo. PU should work with Information Technology to accomplish this. Also any future system upgrades should include sufficient resources to ensure that all relevant data is migrated in a timely fashion.

**Response - A new Data Control Tech II position for data entry is proposed in the FY18 budget cycle. So far, other operational needs have outweighed the needs for the data entry position. Other changes have been made with existing personnel to reduce the burden on the superintendents. A meter technician position was converted to an Office Assistant I, who performs significant data entry. Additionally, Crew Leaders and General Supervisors have been equipped with field laptops with data connections to be used in the field to input information into the Maximo asset management system. This can be performed on the job site, significantly reducing office time for these supervisors. New tablets were ordered and are being issued this summer to Crew Leaders and Supervisors to facilitate field data entry.**

**One superintendent along with several other PU employees participate in the Maximo User Group meetings. We are evaluating possible upgrades to the system to integrate with other systems such as CIS and PeopleSoft.**

## **6. Work Orders**

**Finding – PU’s Water Service did not utilize Maximo to track all elements of work order completion.**

Maximo had the capability to track time and cost information associated with its work orders including evaluating complaints received, planning repairs, obtaining parts, traveling to the work site, and completing the work. Unfortunately, the Water Service did not fully utilize this capacity because Maximo lacked the ability to track the labor of vendor-supplied temporary support workers unless a “workaround” was used. Therefore, the Water Service Superintendent had to use an Excel spreadsheet to track labor costs for City employees and temporary support labor.

This condition occurred because PU was not using the labor field in Maximo to track temporary labor costs. Because of this situation, high level supervisory staff (the Superintendent) was forced to manually track labor costs.

**Recommendation – PU should contact Public Works and Information Technology to determine whether the “workaround“ solution they were using could be used by the Water Service.**

Public Works had addressed a similar entry issue by creating an employee name called “temporary”. PU should evaluate whether this solution can work for them. Also, since this issue is ultimately a system software issue, PU should make IT aware of it and have them contact Maximo to determine whether a more permanent adjustment can be made.

**Response - Public Utilities Water Service section does not utilize all the functionality of Maximo with regard to tracking temporary employee time for work orders. Although this information is helpful, it is not critical unless we are performing a job for which we will send an invoice for reimbursement. With very limited staff (currently 8 vacancies), tracking this information for non-bill jobs is not worth the time it takes.**

Temporary workers have been used as we try to fill our vacant positions with permanent staffing. Although tracking time for temporary employees would be beneficial, the turnover for these type of employees would create addition burdens on our IT department entering and removing temporary employees on a consistent basis. If software changes are needed, funding would be required to implement any changes in CIS or Maximo.

The ultimate solution is to fill vacant slots with full time regular employees instead of temporary employees. PU is working with HR to make this happen. PU has monthly meetings with HR representatives to discuss open positions along with other personnel issues. In the meantime, PU will contact PW and IT to determine if the workaround solution will work for PU.

## **7. GIS**

**Finding – PU was not optimizing its use of GIS to consistently record reliable and complete information of the water distribution piping and components.**

The City’s public website section that describes Geographic Information Systems (GIS), states, “GIS combines people, data, and technology to facilitate the integration, analysis, and visualization of geographically referenced information. GIS supports viewing, understanding, questioning and displaying data in ways that reveal relationships and patterns that can inform action at all levels. GIS in Chesapeake provides the 'WHERE?' for daily operations and emergency activities of the City.”

We noted that Public Utilities was not using GIS to accurately and consistently record locations for water distribution piping and components. Instead, the Water Distribution Division used developers' drawings and institutional knowledge when sending teams to control and repair ruptures.

- We observed a response to a water main leak. Information on the size and type of piping had not been entered into GIS, so contractor drawings were used for the repair plan.
- Excavation projects required contacting MISS UTILITY for utility marking. Public Utilities would mark water and sewer pipes, but did not track the marked pipes using GIS.
- GIS was not used to record pipe clamp repair information. Clamp repairs were considered permanent and expected to stay on the pipe until the banding corroded or the pipe was replaced. Public Utilities maintained an Excel spreadsheet to track water main breaks.

These situations occurred because Public Utilities relied on spreadsheets and institutional knowledge rather than incorporating the information into GIS. If this practice continues, the data and information will not be centralized, and the City risks losing some of it.

**Recommendation – PU should optimize its use of GIS to consistently record reliable and complete information of the water distribution piping and components.**

Public Utilities should compare its GIS to existing contractor drawings and/or known data and then update the GIS records as necessary. Also, Public Utilities should verify existing assets by locating the assets in the field, recording actual position of assets, and entering that data into GIS.

**Response - While we do not currently use our GIS system to its full capacity, we are making progress on getting our data more up to date in the GIS. This will start with getting accurate GPS data (6 inch accuracy) for all surface hardware- manholes, fire hydrants, meter boxes, cleanouts, valves, etc. This will provide a 90% solution for the physical location of all of our buried assets, excluding depth information. To facilitate this process, we purchased one field GPS units this year and plan to purchase one more in FY17 to capture more data. This effort involves GPS'ing more than 150,000 unique surface assets; this is a 20-year data gathering effort.**

**GIS is not the source document for what exists in the ground in the water and sewer systems. It does not contain the details that as-built drawings contain; these details are essential to see specific pipe configurations. As-built information is typically accessible through the GIS database (through the use of hyperlinks).**

As development continues in the city, water and sanitary sewer assets are constantly being added to the PU GIS layers. As new piping is added, materials of construction and size are being recorded in GIS. As time allows and the GIS system matures, materials of construction and size are being updated where they are not already available. Records of water and sanitary sewer repairs are stored in the asset management system software (Maximo).

## **8. Warehouse Conditions**

**Finding – Physical conditions at the PU warehouse and outside storage area needed improvement.**

For a comparable operation, Department of Public Works regulation Condition Assessment of Facilities, #952 states, “Public Works (Municipal Facilities) shall inspect buildings and other facilities on a regular basis to identify major and minor repair/replacement items.” We conducted tours of the warehouse located at the Public Utilities Maintenance and Operation off Executive Blvd and identified several existing concerns related to the physical conditions and storage facilities.

- The warehouse building was on a concrete slab; the floor was at the same level as the surrounding grade. There were no gutters or other rain diverting attachments on the warehouse.
- There were several areas of the warehouse which had black sticky growth. (We notified the City’s Risk Manager and contacted the Facilities Supervisor regarding the status of repairs. At least one storekeeper wore a dust nuisance mask out of concern for potential exposure to black mold, and made a personal purchase of an air filter placed in the storekeeper office. (See Exhibit #11)

**Exhibit #11**



- There were no perimeter or other security cameras.

- The outside secured area was required to be left unlocked while warehouse was occupied since it was a fire exit. There were no alarms or annunciators to alert when gate was opened (See Exhibit #12).

**Exhibit #12**



- Sand and gravel piles were not covered. This may cause a violation of Virginia Administrative Code concerning "Fugitive dust". "Fugitive dust" means particulate matter composed of soil or other materials, or both, of natural origin. Virginia Code 9VAC5-40-90, Standard for fugitive dust/emissions stated, "No owner or other person shall cause or permit any materials or property to be handled, transported, stored, used, constructed, altered, repaired or demolished without taking reasonable precautions to prevent particulate matter from becoming airborne."(See Exhibit #13)

**Exhibit #13**



- PVC pipes were laying on the ground without cover. AWWA M23 General Properties of Polyvinyl Chloride Pipe states, “PVC pipe can incur surface damage when subjected to long-term exposure to ultraviolet (UV) radiation from sunlight. This effect is called ultraviolet degradation. Unless specifically formulated to provide substantial protection from UV radiation (for example, PVC house siding), or unless a limited service life is acceptable, PVC pipe is not recommended for applications where it will be continuously exposed to direct sunlight without some form of physical protection (such as paint or wrapping).” (See Exhibit #14)

**Exhibit #14**



- Pipes with no current lead free certification were kept in warehouse yard. (See Exhibit #15)

**Exhibit #15**



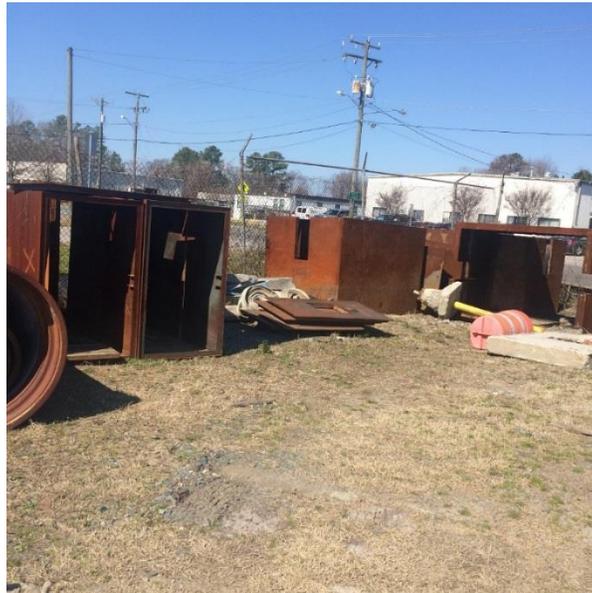
- Damaged fire hydrants had not been disposed of timely. (See Exhibit #16)

**Exhibit #16**



- Large Meter Vaults which were used to install a new large service, or they were used for repairs or replacements (Example: intoxicated drivers will drive over the vaults and demolish the lid and damage the sides; or they may rust completely out and have to be replaced, and so on.) sit out in the elements and rust, therefore potentially reducing their useful life. (See Exhibit #17)

**Exhibit #17**



- The warehouse and M&O security fence was in disrepair. (See Exhibit #18)

**Exhibit #18**



This situation existed because many of the concerns we identified had existed for an extended period of time, and there was no sense of urgency to address them. However, if these conditions are allowed to continue, there will be increased risk of loss of assets and inventory, potential health issues, and possible injury due to damaged structures. Additionally, the expected life of inventory may be reduced without adequate cover. Also, PU could be exposed to violations of environmental laws.

**Recommendation – PU should work with Facilities Management to make necessary repairs.**

To address these concerns, PU should:

- Repair the warehouse leaks and address any potential mold issues.
- Coordinate with IT to install security cameras and alarms;
- Coordinate with Facilities Management to build a shelter and racks for PVC piping;
- Coordinate with Facilities Management to make repairs to the perimeter fence;
- Complete cannibalizing damaged fire hydrants and salvage scrap;
- Obtain and utilize weather covers or constructing a covered storage building for sand and gravel piles.

**Response – A new combined Public Works (PW) Public Utilities Operations facility has been planned for several years. Because it has been in and out of the planning and design phases, it has not seemed prudent to spend funds maintaining facilities that will soon be razed and removed. As a result, only minimal funds have been spent maintaining the physical features at the M&O facility on Executive Drive. While the new facility location is being determined, PU will work with Facilities Management to make suggested essential repairs.**

The addition of new sheltered racks will have to be weighed against the possibility of the combined Operations facility project moving forward. It would not be prudent to construct new facilities at this location if a move was forecast within the next few years.

The scrap piping, ductile iron and a small amount of cast iron, are frequently used for bollards around fire hydrants, meter vaults, and other aboveground infrastructure to avoid the need to purchase bollards. Materials containing lead are not used in the water system. Some of the ductile iron pieces are also used for repairs, large meter assemblies or required short pipe lengths for branch lines to fire hydrants. Neither ductile nor cast iron materials contain lead, for the simple reason that any lead boils out of the iron in the manufacturing process of the cast and/or ductile iron pipe (and has done so for the manufacturing process for iron pipe for over 100 years). Additionally, any cast or ductile iron pipes we use in the water system are lined with cement mortar. The metal surface does not come into contact with the water except for a very small area at joints, fittings, and connections. Lead free is defined as not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures. The wetted surface of these pipes is almost exclusively cement mortar.

To help prevent leaks and water intrusion, the storeroom had new shingles and gutters installed in the last few years. PU management has neither witnessed nor heard of the use of facial masks by storeroom staff in the storeroom other than in this report. Facilities Maintenance has offered to PU storeroom staff on several occasions their services for conducting an investigation of proposed mold, pending PU's movement of inventory materials. The directive to clear the inventory materials will be issued in 2016 to allow Facilities Maintenance to perform proper investigations of discolored wall and ceiling areas.

## **E. Customer Information System (CIS)**

We noted that reconciling differences between PU's Customer Information system and the Hampton Roads Sanitation District system were not researched and cleared in a timely fashion. Thus, the accuracy of some customer accounts was placed at risk.

### **1. CIS Reconciliation**

**Finding – Reconciling differences between the Customer Information System (CIS) and the Hampton Roads District system (HRSD) were not researched and cleared in a timely manner.**

Reconciliation was the process of ensuring that two sets of records were in agreement. The HRSD system transmitted daily payment data to the City which was then transmitted to the City's CIS system. Daily reconciliation of these two systems was imperative to confirm that all payment data transmitted from HRSD was received by the CIS system, and that any differences that occurred could be researched and resolved in a timely manner.

Our review and testing of the reconciliation between the CIS and HRSD systems revealed that when differences occurred between the two systems the differences were not cleared in a timely manner. PU Accounting, PU IT, and PU Customer Service were responsible for clearing the differences between the two systems. The City Treasurer notified PU Accounting, PU IT, and PU Customer Service that they needed to resolve and clear system differences, but they initially did not take responsibility for resolving them. These reconciling differences were a result of HRSD payments not posting to the CIS system, creating a difference in the Treasurer's cash account and PU's accounts receivable general ledger account. Also, these reconciling differences could delay the posting of payments to customer accounts.

At the time of our audit, the reconciling difference between the CIS and HRSD systems was \$887,944, occurring from August 24 to 28, 2015 (five consecutive days work). This difference was caused by incoming transaction transmissions from HRSD that were interrupted during their transmission to the City. These transmissions were rerun which created duplicate and voided entries. Also, to compound the situation, partial adjustments were made without accounting for the total dollar amount of the difference. This out-of-balance condition was not fully resolved by PU IT and PU Accounting until February 5, 2016. PU Customer Service then received reconciling differences to research and resolve which took five days or longer to research and clear. PU Accounting, PU IT, and PU Customer Service areas did not initially understand the effects these differences had on each of their areas of responsibilities. Each of the three areas were interdependent on each other. (Note: These issues were corrected during our audit).

Additionally, the PU IT Systems Analyst who was hired in May 2015 did not have a complete understanding of the job responsibilities related to resolving system differences. This position was vacant for six months before the new analyst was hired, so there was no transfer of knowledge from the previous incumbent, and PU management had not assigned a designated manager to oversee the PU IT staff. Also, the City IT control room had not received control totals on incoming transmissions received from HRSD. Note: These issues were also corrected during our audit).

This situation occurred because PU IT, Accounting and Customer Service worked independently of each other without fully comprehending their interdependence. There was also minimal oversight over the PU IT, and the Systems Analyst had to rely on a third party vendor to resolve the differences that occurred. If these situations are not addressed some customer payments may not be posted to customer accounts in a timely manner. Customer accounts could become delinquent, potentially creating customer billing issues.

**Recommendation – The CIS and HRSD systems should be reconciled daily and all reconciling items be researched and cleared in a timely manner.**

The following issues should be addressed:

- PU should ensure that management oversight is in place over PU IT.
- PU Accounting, Customer Service, and PU IT should get together to resolve reconciling differences in a timely manner.
- PU should ensure that its accounts receivable general ledger account differences are identified, researched, and cleared in a timely manner.

(Note: These items were addressed during our audit).

**Response - The issues cited for the audit have been resolved, and systems established to ensure that any future issues are quickly identified. CIS and HRSD systems are reconciled daily and any differences are identified, researched, and cleared in a timely manner. The PU IT Systems Analyst is much more comfortable with the system, and Accounting and Customer Service are working together when problems are identified. We have established a much better understanding of each of our software systems, the interfaces between them, and the interaction required between departmental teams.**

## **F. Customer Service – Cash & Settlement - Billing**

Customer billing experienced a significant backlog during 2015, resulting initially in skipped bills and later in enlarged bills to customers. Also cash handling and settlement procedures needed to be enhanced.

### **1. Billing**

**Finding – Customer billing was behind by over 2,500 service orders for several months during 2015. This created multiple instances where customers’ bills were skipped and then “caught up” by being billed for four months on their next cycle.**

Billing systems must be both timely and accurate. Customer bills should be produced on schedule to keep an orderly flow between billings and collections. Bills must be accurate to ensure that customers are paying the correct amounts. Should there be a need to adjust the bill for errors or other changes, those adjustments should be applied as soon as possible to avoid too much time passing between the cause of the adjustment and its appearance on the bill.

We noted that Customer adjustments were not being completed in a timely fashion. PU’s Billing section indicated that, as of September of 2015, they had approximately 1,500 service orders that needed to be processed or completed. A subsequent follow up with PU Customer Service indicated that the number of service orders that needed to be processed was approximately 2,500, resulting in a several month backlog. PU estimated that the longest delay was 1 ½ to 2 months. (Note: By the end of our audit testwork the backlog had been reduced to a little less than 300 service orders outstanding 14 days or less and no service orders outstanding beyond 14 days).

When a customer believed that there was a problem with their water usage they would contact PU Customer Service. Customer Service would usually request that a “reread” be conducted on the account. The “rereads” were not being completed in a timely manner, causing the data necessary for any adjustments to arrive late to the billing clerks.

The delays in processing service orders timely had several causes that combined to create the backlog. First, the service order reports were being run by Billing and Customer Service using different parameters that resulted in each section having different numbers for outstanding service orders. Second, the Billing Section had a long term supervisor retire in 2015. This retirement demonstrated that Billing Section personnel were not cross trained in a sufficient manner to help with the work load during the staff shortage. Third, the computer system was upgraded during 2015. The system operated well in testing but when it went live there were significant slowdowns in data processing, creating detrimental effects on the processing of bills and service orders. Fourth, during 2015, one of the meter readers had a personal issue that resulted in more errors than normal on his routes.

The backlog in service orders caused necessary adjustments and billing to be delayed for hundreds of customers. Missing the normal billing cycle in many cases resulted in the customer account not being billed out until the next billing cycle, resulting in bills that covered four months or more being sent out to customers. While the bills themselves were accurate, the resulting higher than normal bill amounts had customers calling PU Customer Service and City Council members.

**Recommendation – PU should ensure that service orders, “rereads,” and other exceptions are handled in as expeditious a manner as possible.**

PU should ensure that sufficient staff are cross trained and capable of handling other tasks that they can help with the work load for short periods of time. PU should also develop customer notices that can be sent out when there is been a delay in a customer’s bill being sent out. Various letters, such as “thank you for your patience” and “we’re sorry for the delay,” should be considered. Finally, PU and IT should determine the cause of the processing slow down and remedy the problem.

**Response - The difference between the number of Tab Rereads (internally generated) and the reported 2,500 open service orders may be from two separate reports. The numbers are measuring different things. There is a Smartlist (CIS generated report) that identifies the total number of open service orders in CIS. This includes customer requested rereads, Tab Rereads, and all other types of service orders. This report has exceeded 2,500 open service orders that the division is placing great emphasis in completing.**

**The audit states that “delays in processing service orders timely had several causes that combined to create the backlog. First, the service order reports were being run by Billing and Customer Service using different parameters that resulted in each section having different numbers for outstanding service orders. Second, the Billing section has a long term supervisor retire in 2015. This retirement demonstrated that Billing section personnel were not cross trained in a sufficient manner to help with the work load during the staff shortage. Third, the computer system was upgraded during 2015. The system operated well in test mode but when it went live there were significant slowdowns in data processing creating detrimental effects on the processing of bills and service orders. Fourth, during 2015, one of the meter readers had a personal issue that resulted in more errors than normal on his routes.”**

**The impact to billing should be ranked as:**

- 1) Retirement of a long-term supervisor. The retiring employee retired in July, 2015. This supervisor was also the highest production employee in terms of service order completion. Additionally, this employee possessed a knowledge of billing whereby she could look at an account and quickly**

determine the likelihood that a problem or error existed with a meter reading. This is a previous knowledge experience that evolves over time and is not something that cannot be cross-trained. It comes with experience. A new employee was hired in September, and her training began immediately. The new employee proved to be a very quick learner; however, the knowledge experience described above is an on-going process that will only come with time.

- 2) **CIS upgrade and server issues.** The software upgrade was put into Test version and no program or server issues were found during multiple testing sessions that occurred in March as well as August 2015. The upgrade was installed into production on September 13, 2015. Beginning September 14, we found severe delays from the server and billing errors began to appear on bills. Billing was halted on September 24 to prevent billing errors and it was discovered that our upgrade put into production was missing a software patch designed to prevent the errors we were experiencing. Additional testing had to be performed to ensure that no billing errors existed and we were able to resume billing on September 29. By this time, three cycles that were scheduled to be billed were delayed which caused significant backlog increases.
- 3) **Meter misreads.** Everything in billing is contingent upon the accuracy of the meter readings.
- 4) **Cross-Training.** We identified various types of work such as review and approval of leak adjustments and completion of non-billing service orders and have cross-trained clerks outside of the Billing Section as well as other support staff members to complete these responsibilities. This has enabled our billing staff members to focus on billing and account corrections more expeditiously.

We have implemented changes to how we assign cycles for billing. We formerly had the responsibility for preparing a cycle for billing and completing Tab Rereads assigned between two individuals whom took turns between alternating months. Both employees have been reassigned to work on billing cycles and completing Tab rereads jointly. Other support people within Customer Service have been cross-trained to complete non-billing service orders to reduce the backlog of other types of service orders.

A recommendation was made suggesting that customer notices be developed to send to customers when there is a delay in billing their account. Letters have been drafted for this purpose, were mailed to the impacted customers in the circumstance described in the Audit, and will again be employed if significant delays occur in the future.

**“Finally, PU and IT should determine the cause of the processing slow down and remedy the problem.” This analysis is ongoing and significant progress has been made. We have now attained a CIS system speed that matches what we experienced before the September 2015 upgrade. The primary factors which allowed us to reestablish our former performance are:**

- 1) Installing solid state drive storage.**
- 2) Database synchronization between the primary and secondary databases.**

**At the same time as we upgraded the CIS system, IT upgraded the City’s computer network hardware including improved security. This design had not been implemented by any other Cogsdale customers, nor had it been present when we were testing the new software. While this contributed to our performance reduction, we determined we did not want to make any changes to the security structure lowering our data security.**

**Cogsdale is also improving its software performance.**

## **2. Cash Handling and Settlement**

**Finding - The cashiering process in place for PU Customer Service was inefficient and was not designed to promote good customer service. In addition, procedures for cash handling, petty cash (p/c) and settlement processes did not sufficiently address cash handling, petty cash, settlement, internal controls, and the safeguards over assets needs to be enhanced.**

An effective cash control process should incorporate the following attributes:

- Documented cash handling, petty cash, settlement, and control procedures
- Safeguarded cash funds within the department
- Controlled duplicate keys and combinations to cash funds and safes
- System control totals for settlement of cash
- Defined and detailed daily settlement processes including settlement time(s), use of count sheets with signatures and dates, counts of the entire cash fund, processing of overage and shortages, and periodic surprise cash counts
- Defined cash exchange processes
- Reconciliation process for p/c funds
- Receipts utilized when funds were issued and returned
- Receipts for purchases were on hand and documented the use of funds
- Reconciliation forms reviewed by supervisor’s and cash on hand verified
- Training provided for cashiers

We evaluated the cash handling, internal control processes, and safeguarding of assets in the customer service area to determine if cash handling processes were functioning as designed and cash funds were adequately controlled and safeguarded. We determined that the \$45 change fund limit for cashiers to service customers was too low which added wait time for customers to pay their bills, took cashiers away from their work stations, and interrupted coworkers because they needed to make change to service their customers. In addition, the change fund utilized to exchange cash was kept in a lockbox which was kept locked in a safe; therefore, the safe and lockbox had to be accessed to get to the change fund while customers were waiting unattended at the cashier's workstation.

There were six (6) change funds, five (5) funds at \$45 and one fund at \$200. The five (5) change funds were kept in the floor safe in a locked deposit bag and keys to the bags were controlled by each cashier (duplicate keys to deposit bags were kept in a sealed envelope signed across the flap in the safe). Two of the \$45 change funds were used by cashiers on a daily basis to service customers and were settled at the end of each day. Cashiers were rotated once each quarter to service customers. The other 3 change funds were not being used each day and were not being periodically surprise counted. The excess change funds were counted at the end of each month.

We noted the following internal control weaknesses that needed to be addressed:

- Overall cash handling and settlement policies and procedures needed to be enhanced.
- Three employees had keys to the lockbox containing the \$200 change fund.
- The \$200 change fund was not counted at the end of each day. When the fund was counted the count was not documented on a count sheet. The count was documented on an adding machine tape that was not labeled, initialed and dated.
- The \$200 change fund was not locked in a drawer under the sole control of one individual during working hours for easy access when needed.
- Four employees had the complete combination to the safe where the change funds were kept.
- Customer checks were being held when meter calibration fees were received from customers rather than processing those fees to the CIS system. In addition, there was no periodic accountability for these transactions.
- The City Treasurer system was not always settled on the day when connection fees were paid. Transactions were held for up to five (5) days or longer before being processed to the Treasurer system. In addition, segregation of duties was not in place as reconcilers reviewed and approved their own work.
- Cash exchanges between cashiers were not being documented when they occurred. Therefore, if an error occurred there was no record to assist with the reconstruction the day's transactions to find the error.
- Cash overage/shortages were not processed on the date they occurred to the general ledger. One cashier had an overage of \$0.75 which occurred 8/27/15,

during our cash count, but the difference was not processed to the general ledger until 10/7/15.

- The safe was not affixed to the wall or floor.
- The combination to the safe was not changed when employee turnover occurred. In addition, no one could remember the last time the combination was changed.
- The safe log did not fully document the movement of assets, who accessed open/closed the safe, date and time transactions occurred.
- Cashiers were being rotated once each quarter to wait on customers; therefore, spare change funds could set in the safe for as long as 9 months without being used. Change funds that are not used on a daily basis need to be eliminated.
- Plastic bags were not being used to store change funds rather than deposit bags which would eliminate the need to control and account for keys to the deposit bags.
- Surplus cash in excess of the established \$500 drawer limit was not documented on an adding machine tape and the excess cash was not placed in a tamper evident plastic bag and place the bag in a locked lower drawer until it could be placed into the safe.
- Surprise cash counts were not being performed on change funds on a periodic basis.
- A review of HRSD's settlement sheets revealed the following:
  - Beginning change fund of \$45 was removed fund and was counted as part of the end of the day settlement count.
  - Count sheets were used but they were not signed by the cashier or verifier.
  - Adding machine tapes were not labeled, initialed by the preparer and dated.
  - Verifier does not document their count on a count sheet.
- The Administration petty cash fund was not under effective sole control of the responsible person as the key to the file cabinet and cash box was left in an unlocked drawer at night.
- The Petty Cash (p/c) Reconciliation Form was not verified and signed by a supervisor when p/c fund was replenished. It should be noted that eh p/c fund was counted at the end of each month by the accounting department.

This condition existed because procedures needed to be enhanced, documented, and implemented for cash settlement, cash handling, petty cash processes and the safeguarding of assets. Also, no monitoring process had been developed and implemented to ensure controls were in place and functioning as designed. If cash handling and control procedures are not established and periodically monitored, the risk exists that cash funds could be misappropriated.

**Recommendation – PU Customer Service should develop and document cash handling, cash settlement and petty cash processes so that cash is adequately safeguarded. In addition, PU customer service should develop an ongoing oversight and monitoring process to ensure adherence to cash handling and cash control procedures.**

Enhancements of cash control procedures should address the following areas:

- Consider increasing the change fund cash limit to reduce the number of times that cashiers have to replenish their change fund to serve their customers.
- Decrease the amount of cash in the \$200 change fund and keep the fund in a locked facility under the sole control of one person so that it is easily accessible to provide change to the cashiers as needed. This fund is kept locked in the safe during the day and at night.
- Eliminate all cashier change funds that are not utilized on a daily basis. There are 6 change funds and only 3 funds were being used each day.
- Keep the \$200 change fund under the sole control of one individual. Three employees have the keys to the lock box housing the \$200 change fund.
- Count the \$200 change fund at the end of each day and document the count on a count sheet.
- Access to the safe should be under split combination control so that no employee has complete access to the safe. In addition, the safe should be affixed to the wall or floor. Also, the combination to the safe should be change when employees leave the division.
- The Vault/safe log should document the movement of assets, who accessed open/closed the safe, and date and time transactions occurred.
- Cashier overages and shortages should be process to the general ledger on the date they occur.
- Cash that is exchanged/transferred between cashiers should be documented on a form to include the amount of cash exchanged/transferred with the signatures of both cashiers involved in the transaction.
- Discontinue holding customers checks for meter calculations. The checks should be processed on the date they are received.
- Surprise cash counts should be performed periodically on each change fund (at least once a quarter).
- Consider using plastic tamper evident bags to store change funds which would negate maintaining duplicate keys and the controlling of keys by cashiers.
- The City Treasurer's system should be settled at the end of each day. In addition, change funds should be counted by the cashier and verified by a second individual and documented on a cash count sheet.
- The HRSD settlement process should include the following changes: All funds should be counted before removing the till amount, count sheets should be signed by cashier, adding machine tapes should be labeled, initialed by the preparer and dated, and verifiers should document their count on a count sheet.
- Suggested petty cash process should include the following changes: petty cash should always under the sole control of one responsible person; a supervisor should verify cash on hand and account for receipts when the petty cash fund is replenished; a supervisor should sign the reconciliation form, and a supervisor perform surprise petty cash counts at least once each quarter.

- The Finance Department should be notified when changes in responsibility for change funds and petty cash occur.

**Response - During this review period we have taken steps to increase our internal controls. Acknowledgment of this concern was evident when the decision was made to add a position to this area in customer service. In October 2015, we hired a former bank manager to further drive changes needed to our internal controls. Since her arrival, we have made many changes.**

**A new safe has been installed. In line with recommendations, the safe is bolted to the floor. It also has a combination that has been split between various staff members. All access to our safe requires two parties to be present and documentation of entry. The safe also includes a deposit slot where items dropped can only be retrieved by opening the safe (under dual control) and unlocking a box within the safe as an added safeguard. Based on findings in the report, the safe's dual control combination will be changed within 30 days of any employee's departure.**

**We have also reduced the number of cashier funds (bags) from five to three. Additionally, the drawer's balance was increased from \$45 to \$75. This change allows our cashiers to request change less frequent. Though we only have two workstations for cashiers, the third drawer is necessary to avoid down time in situations where a change in cashier is needed during the day (part time employee).**

**The \$75 cash drawers are counted daily under dual control. The contents are placed in a tamper proof plastic bag, and they are dropped in our safe each evening between 4-5 PM. Since this process was implemented, each drawer is used at least once during a 30 day period. Additionally, the accounting division will verify funds within the safe on a monthly basis.**

**The review also referenced using a tamper evident bags to drop cashier overages exceeding \$500.00. Since the initial review, we implemented the usage of single pouch tamper evident bags in these cases as well. Many cashiering systems include functionality to notify the cashier when their drawer has exceeded specified limits. However, the cashiering system provided by HRSD does not include this function; therefore, staff heavily relies on a manual process.**

**Handling the \$200 change fund under sole control is challenging since all clerks assists customers, but the funds will get counted daily. Calculator tape will be kept in the drawer until the monthly accounting review is conducted. A log will also be created to show the names of the two parties who count it, date, time, and the amount counted. It will be kept in the safe drawer box.**

**Overages will be processed to our over/short fund by the following day to give adequate opportunity to research the cause. There are also some practical concerns as we are unable to process transactions to our Treasurers system after 4:30 PM. If an out of balance condition exist our HRSD reconciliation may exceed 5:15 PM.**

**We are reviewing recommendations to process the meter test check as they are received. However, checks for meter test are held for reasons when a meter test out of tolerance and funds get returned to the customer. If they are processed upon receipt we must make preparations for providing electronic refunds. Currently, our CIS/HRSD interface does not support this process.**

**We have created a change exchange form to document cashier fund exchanges.**

**We are also reviewing the recommendation to have pay in voucher processing and reconciliations performed by separate parties each evening. End of day cashiering related reconciliations must be managed in conjunction with our ability to address customer concerns relative to normal customer service disputes and late day interruption of service. These additional duties reduce the number of clerks available to assist customers. We intend to address these issues through two new positions (already approved for 2016-2017) that will assume these responsibilities as well as take an active role in many of the recommendation provided in this review. The division is also reviewing current staff roles with a plan of action to restructure two areas of Customer Service and Collections into one consolidated area, increasing team flexibility.**

## **G. Water Production**

Our review of the water production and distribution areas identified an issue related to nuisance birds. The design and operation of the water treatment plants attracted these birds, and their presence created facility and health risks.

### **1. Nuisance Birds**

**Finding – The Water Treatment Plants’ (WTP) design and operation attracted nuisance birds that caused corrosion and potential spread of disease to workers and visitors around the facilities.**

Virginia Cooperative Extension publication 420-03 states, “Canada geese are a part of our ecological system, they contribute to natural biological diversity, and they provide a variety of potential benefits to humans. However, many of these values are being overshadowed today by the negative effects of the damage that resident geese cause and issues of public health and safety.”

The Northwest River WTP had a membrane roof over the filter tanks structure. This open air design had attracted pigeons to nest. Bird droppings contain uric acid which causes corrosion to steel and other building materials unless the droppings are continuously removed. The Lake Gaston WTP was in the process of installing a membrane roof for its filter tanks, so it risked a similar problem. (See Exhibit #19)

#### **Exhibit #19**



Pigeon and other bird droppings

Canada geese arrived annually at both WTPs for nesting and raising of goslings. Canada geese were protectively aggressive of nests and goslings. Although no known injury had been associated with the aggressive behavior, several employees had geese charge at them. Also, Canada geese produced large quantities of droppings which were known to contain several diseases, plus the droppings were slick. Since Water Treatment Plant’ operators made frequent tours of the facilities and through the droppings, they could inadvertently spread geese dropping residue throughout the facility. (See Exhibit # 20)

## Exhibit #20



Bird droppings on walkways and other traffic areas.

The cause of the pigeons' attraction was the open design of the water filter tanks' enclosure. This design, as with aircraft hangars, allowed nesting and resting areas away from predators. The cause of the Canada geese population was the lack of an established deterrence from nesting. If these conditions continue to exist, there will be degradation of the enclosure from bird droppings. Also, if the Canada geese nesting continues near Water Treatment Plant workers and visitors routinely travel, there is continued risk of injury from attack or just slipping, and exposure to various diseases.

**Recommendation – Public Utilities should work with the appropriate federal and state agencies to address the issue.**

Public Utilities should work with the Virginia Department of Game and Inland Fisheries; U.S. Fish and Wildlife; and U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services to develop non-lethal methods of controlling bird populations at the Water Treatment plants and distribution areas. Any plan developed should take into consideration the strong homing instincts and relatively long lifespan of Canada geese.

**Response - Many forms of goose control were deemed to not be appropriate for our water treatment facilities on Battlefield Blvd. or Western Military Highway. Earlier this year, DPU purchased decoy coyotes which function to scare away geese and other nuisance birds from our water treatment facilities. To date, it appears these coyotes have been effective. We are currently evaluating bird netting and other systems to reduce or eliminate pigeon access to the water treatment area. Note that the majority of our water at the Northwest Water Treatment Plant – that treated by our reverse osmosis units - is treated without passing through the open-air component of the conventional treatment process. Additionally, the open air component is relatively early in the water treatment process, and the follow-on treatment resolves any issues that may be temporarily created by the birds' presence.**

## **H. Contracts**

We noted several areas where contracting practices could be enhanced. Some contracts lacked some technical information, applicable inflation indices were not always specified.

### **1. Contracts**

#### **Finding – Contracting practices for Public Utilities could be enhanced.**

City Code Section 54-34, Specifications for supplies, services and construction stated:

“(a)Under the oversight of the city manager or designee, the procurement administrator or designee shall prepare, issue, revise, maintain, and monitor the use of specifications for supplies, services, and construction required by the city, provided that:

- (1) The procurement administrator or designee shall obtain expert advice and assistance from personnel of using departments in the development of specifications and may delegate to using department’s responsibility for the preparation and maintenance of specifications generally or for specific supplies, services or construction, subject to approval of any such specifications by the procurement administrator or designee.”

We reviewed 27 contracts issued during FY14 and FY15 and noted the following:

- The contracts reviewed had the defined deliverable, (Scope of Work) as a section of the contract. The Scope of Work documented the vendor’s written contractual obligations, and as such it should be sufficiently detailed to minimize misunderstandings. We identified several contracts that we believe lacked sufficient technical information. For example:
  - The type of metal for fasteners needed to ensure the minimization of galvanic corrosion was not defined (Contracts# 15-021-890-44, #15-139-031-13, & #15-176-670-81)
  - Documentation required for cabling continuity certification was not determined (#15-159-285-09);
  - Gas relief valves for manhole inserts had a pressure set point but not a minimum flow rate (#14-169-885-44).
- Price escalation or de-escalation was allowed after one year for multi-year contracts using either the Consumer Price Index (CPI) or Producer Price Index (PPI), but the specific CPI or PPI index and month to be used was not specified.
- Several contracts listed specific employees as contacts who no longer worked for the City. For example, in March 2016, Contract #14-168-885-44 had a contact employee listed who had terminated July 31, 2014.

- Contract #14-165-285-00 for electrical panel replacement at two sewer pump houses was issued on June 16, 2014 as a five year contract instead of the two or three month contract necessary (contract work was completed in July 2014). Also, the contract did not include liquidated damages for failure to comply if the project was not completed by a deadline.
- Required Procurement Officer approval was not obtained in instances where initial contract estimates indicated such approval was required. For example, on Contract #15-070-912-00, the annual contract pricing schedule was \$112,215 which exceeded the “may not exceed specific written approval amount of “\$110,000. Similarly, for #15-139-031-13, the annual contract estimate was \$169,950 but the “may not exceed without specific written approval” amount was \$100,000
- Contract #15-139-031-13 required the vendor to obtain “permits” instead of specifically identifying the permit(s) required where the information was available.
- Contract #15-139-031-13 required contractors to operate plant valves and components when such operation was actually the responsibility of Public Utilities staff.

These situations occurred because Purchasing relied upon the technical expertise of departments for review of technical issues, and departments did not consistently provide independent review of the draft contract documents or bid proposals. Also, the City did not consistently review metrics for price increases, inclusion of terminated employees listed in contracts, appropriate contract lengths, or contractor responsibilities. If these situations are not addressed, PU and the City will not be sufficiently protected by contract terms. Also PUs had to follow up with vendors in situations where listed contract employees had left the City, creating additional work.

**Recommendation – PU should work with Purchasing to enhance its contracting practices.**

PU should consider the following actions:

- Ensure that contract Scope of Work is sufficiently detailed to minimize misunderstandings.
- Work with Purchasing to determine appropriate specific CPI or PPI indexes and time frames to be used in contracts.
- Utilize employee titles instead of names for contacts, and ensure that the contacts remain current
- Ensure that contract lengths are appropriate and include liquidated damages for failure to comply where appropriate.
- Ensure that Procurement Officer approval is obtained in instances where initial contract estimates indicated such approval was required.
- Specifically identify the permit(s) required for contracts.

- Ensure that contracts accurately define City staff and contractor operational responsibilities related to contractor operations.

**Response - Public Utilities requested and was approved to hire a new senior engineer to serve as a Capital Project Manager as part of the FY17 budget. This individual will bring management of our capital program under one supervisor. Standardizing and improving our contracts is one of this individual's specific objectives. This individual will also provide quality control over our capital contracting process. Most of the identified situations and recommendations are relevant to capital contracts, and will be under this individual's purview.**



# **APPENDIX A**

**RESPONSE FROM**

**PUBLIC UTILITIES**

**OFFICIALS**

TO: Jay Poole, City Auditor  
FROM: David Jurgens, Utilities Director  
DATE: July 18, 2016  
RE: Detailed Responses to Performance Audit Report- Public Utilities

---

This document contains the specific responses to the findings and recommendations contained in the Performance Audit Report issued by the City of Chesapeake Internal Auditor in July, 2016.

### **C. Pro Rata Program**

#### **C. 1. Pro Rata Engineering.**

**Finding - The process in place for the handling of pro rata development projects was inefficient, labor intensive, and time consuming. The engineering staffing levels were not sufficient to handle the volume of pro rata projects approved by PU. In addition, pro rata projects were not a priority for PU Engineering. Therefore there was a lack of management review, monitoring, and oversight over these projects for many years. Further, pro rata policies and procedures lacked sufficient detailed information for the handling of pro rata projects and had not been substantially updated since the inception of the program.**

As a result of internal actions relating to the pro-rata program, working with the City Attorney's office, DPU staff committed in 2015 to fully evaluating and modifying the pro-rata program. It was recognized at that time that the process was very labor intensive and time consuming.

*Recommendation – The Engineering Division should strongly consider reevaluating their process for handling pro rata projects. The pro rata calculation process should be streamlined to become less time consuming. In addition, Engineering should provide additional oversight and monitoring over pro rata projects. Further, policies and procedures should be updated.*

#### **Response:**

As a result of internal actions relating to the pro-rata program, working with the City Attorney's office, DPU staff committed in 2015 to fully evaluating and modifying the pro-rata program. It was recognized at that time that:

- the engineering portion of the process was very labor intensive and time consuming;
- there was insufficient involvement from DPU's Accounting staff;
- the program had become difficult, if not impossible, to properly manage as it was currently structured; and
- the program objectives are excellent, it is the mechanisms that need to be modified.

As a result of this realization, I specifically requested the Internal Audit team conduct a thorough review of the pro-rata program in our opening meeting. Having now received the evaluation from the Auditor, DPU is working on proposed revisions to the pro rata policy and procedure. Pro-rata is a City Council policy, and any changes must be formally approved by the City Council. The procedure may be revised by the DPU Director.

Thus, the pro-rata program is being fully reevaluated, with the following objectives:

- Maintain the objectives, whereby the costs borne by a first developer are properly borne by subsequent developers.
- Streamline the engineering evaluation portion of the process.

- 
- Ensure the Accounting team is fully involved in both development and execution of the program, in whatever form it takes.
  - Determine a method whereby the actions relating to a specific development can be considered completed and closed out.
  - If possible, add a mechanism for the Utility to weigh-in to increase infrastructure capacity beyond the immediate area's needs. For example, it is generally not considered fair for a developer to install a 30 inch water line, but there may be times when a 30 inch line is required as part of the overall water system. There is currently no mechanism to relieve the developer of the added cost of this larger pipe, and this cost either results in the required pipe size not being installed, the developer dropping the project, or the developer paying a much higher cost for installed infrastructure.

During the audit, DPU staff adjusted its process to incorporate many of the recommendations contained in the Audit Report. Additionally, while the long-term evaluation is underway, staff will continue to research to determine what actions, if any, were not captured in the documentation evaluated in the audit. Specific responses are addressed below, in the order they are stated in the report:

- Engineering will include needed documentation in the revision of the pro rata procedure, as well as oversight, auditing and whatever else is needed.
- There are 97 cases where no pro rata payments have been collected, nor costs reimbursed to the first developer. Some cases containing no payment information are valid, and no payment was ever received. There are also some cases where pro rata payment was not collected during the development process when it should have been. For these, staff is researching the cases and will collect the funds if able.
- In addition to modifying the program, we believe that the staffing levels in the Engineering team remain insufficient to maintain the program in whatever form it takes. We intend to either hire temporary staff or contract out most of the catch-up work (as much of the work is not long-term sustained work). We are requesting the addition of one Engineer II to DPU Engineering staff to focus primarily on pro rata.
- Regarding the conundrum created by the timing of the developer's decision of whether to receive connection fee credits or pro-rata payments, this is a challenging question. Connection fee credit is more attractive to both the developer and, financially, the City. But the timing creates accounting challenges. We need to determine a method of tracking connection fees early enough in the process to meet the requirements of all involved.
- We are working with the Accela team to modify existing and creating new records in the eBUILD system. We are checking our pro rata files and are adding utility service areas to the GIS database. The goal we are working toward is making GIS and pro rata file folders consistent.
- File folders are now centralized and accessible.
- Quality control reviews are expanded and will be implemented with the revised pro rata procedure.
- There was a pro-rata check off in the old main frame software that stopped plat recordation for development projects. This allowed certainty that pro-rata payments were made when appropriate, before the development actions were recorded. There is a switch in eBUILD that will stop plan approval, but pro-rata has not yet been linked to this because pro-rata calculations are currently so far behind. Development and Permits has an executive override for the switch, and presently has the switch 'Off,' because calculation of pro rata significantly lags development plan approval.
- DPU staff will track when pro rata payment is deferred to activation of utilities.
- References to 'cash' have been removed from pro rata correspondence and agreements. Engineering and Accounting are working together to determine appropriate segregation of duties.
- Automation may work as a step to follow notification of pro rata owed. This appears to be another point where duties should be segregated.

- 
- Developers frequently change project names. The same project passes through Planning, Development & Permits and DPU, all of which use a different protocol for project filing. The Planning Department organizes their project files by a number referencing the year & the type of application. Development and Permits Engineering determines project names in the files (electronic & physical). Development and Permits also assigns a project number used in Accela and other files. They use the project number (AC number) for file organization. DPU organizes projects alphabetically by project name. When the developer changes a project name (often at the City's request), we leave a reference to the new name in the databases we use (Laser Fiche, file folders), so that a name change does not confuse someone searching for a specific project. At the new name, we also leave a back reference to the old name. DPU also keeps a project list with cross-reference data.
  - First developers cannot receive reimbursement until providing complete cost data; however, this does not relieve DPU of the duty to collect pro rata payment from subsequent developers. The policy, procedure and agreements provide for collection of estimated pro rata, with a final amount to be determined when cost data is received. Most developers provide the information willingly, since they are due reimbursement.
  - The auditor, with a background in accounting & finance, and DPU Engineering have a fundamental philosophical difference about pro rata payment from a subsequent developer. The auditor thinks of pro rata as a bill the developer owes to the Utility. Once the notice is sent, the thirty-day clock starts ticking, and interest & penalties will accrue until the money is tendered. Non-payment will result in legal action. Early payment may result in a half-percent discount on the bill.
  - The subsequent developer is responsible to pay the pro rata owed when he is ready for plan approval, plat recordation or activation of utilities (setting of water meters). These are all significant events for the developer, providing plenty of motivation. Adding a requirement to pay within a time period does not fit the intent nor application of pro rata, which is primarily a development tool. The developer does not actually owe any money until he is using the facility. State code and City code talk about the developer paying a share of the facility cost based on his pro rata percentage of flow through the facility. Charging earlier is not appropriate. However, this position does not preclude other controls. We will develop a method of tracking pro rata owed notices, to ensure appropriate collection. The eBUILD system contains a record type for pro rata payment and ties the payment to the developer's project. The Accela database should work for gathering pro rata owed notices for various developers. We concur that we must track subsequent developer notification letters versus payment, and plan approval/ utility activation.
  - For first developers, we could add a time limit (90 days) with some penalty for failure to provide detailed cost data for new pro rata facilities. However, most developers are glad to provide the project cost data because they are eligible to receive reimbursement money once the pro rata calculation package is complete. The detailed costs are required before any reimbursement to the first developer. DPU staff believes changing the pro rata policy and procedure for reversion of funds back to the City would receive significant opposition from the development community. This would also remove motivation for developers to continue to work in Chesapeake. DPU recommends against such a penalty.
  - The sunset clause was struck from the original policy and procedure in 1997 based on a City Attorney opinion that was recently reaffirmed. The City is the only entity able to manage a pro rata system extending over decades. Full development of pro rata utility service areas normally extends over many years, and will likely span several decades. If the first developer opted to receive reimbursement in the form of connection fees, then the only way for the Utility to recover those fees is to collect the pro rata over years from the subsequent developers.
  - The pro rata notification letters have been revised to remove reference to cash payment. The revised letter templates have been filed in a common 'Go-By' folder on the Shared Drive for all to use. DPU Engineering staff have been advised that we will not accept cash payment.

- 
- All information is being shared between DPU Engineering and DPU Accounting. This is probably the number one improvement related to the pro-rata program made to date.
  - DPU staff is evaluating all pro-rata projects to determine what information has not been received and what actions have not taken place, including, but not limited to:
    - o Cost data not received from first developers; and
    - o Bills for amounts due not provided to subsequent developers.

## **C. 2. Pro Rata Accounting**

**Finding - PU revenue reflected on the City's Comprehensive Annual Financial Report (CAFR) had been overstated and liabilities understated for numerous years. Subsidiary records for pro rata projects had not been kept up to date and had not been reconciled to the general ledger. Also, the Accounting Division did not have a complete understanding of the pro rata project process. Communication between the Engineering and Accounting Divisions was limited even though the divisions were dependent on each other to ensure proper accounting for pro rata projects. Further, accounting policies and procedures for the handling of pro rata payments and disbursements needed to be updated.**

*Recommendation – Incoming pro rata payments should be posted to liability accounts verses revenue accounts. Subsidiary records should be kept up to date and be periodically reconciled to the general ledger. The accounting division should have a complete understanding of the pro rata process. The lines of communication between the accounting and engineering divisions should remain open at all times. In addition, pro rata policies and procedures for accounting division should be updated and followed.*

### **Response:**

PU Engineering and Accounting have worked together a great deal to increase the combined teams' understanding of the pro rata process. Whereas Accounting was minimally involved in the program since its inception, that has changed, and they are now integrally involved in the process.

PU Accounting has computerized the financial records that were available via the engineers' pro rata project files. The Department is in the process of hiring an external firm to perform an accounting review of these electronic records and provide reconciliations of engineers' project files to the City's accounts and records. After the review, the pro rata liability for the period ending June 30, 2016 will be determined. Future financial and internal controls will be implemented after the pro rata business processes have been updated. At a minimum, monthly, quarterly and annual reconciliations will be required as well as timely escheat filings.

Accounting treatments of the pro rata program were reviewed annually by the City's Finance Department and the City's external financial auditor. No recommendation was made to change the accounting and financial reporting of the pro rata related receipts and disbursements. Changing the accounting practices of how these payments are handled is, in effect, a change in accounting treatment for this program.

## **D. Maintenance and Operations (M&O)**

### **D. 1. Aging Meters**

**Finding – The M&O Division had not replaced all aging residential (5/8" to 2") water meters which were over fifteen (15) years old as required. In addition, the fifteen (15) year guideline was not documented in the division's policy and procedures.**

---

*Recommendation – PU should develop and implement a realistic residential meter replacement program. Additionally, the PU department should consult with Human Resources to evaluate the cause of the continual vacant positions in the water service section of the M&O division and develop a plan to mitigate the continual vacancy issue. Further, meter replacement policies and procedures need to be documented.*

**Response:**

Public Utilities concurs on the need for a realistic residential water meter replacement program and such documented policies and procedures. Public Utilities is requesting several additional positions over the next three year budget cycle to assist with the meter replacement program. As resources become available, PU will continue to replace broken water meters and those over 25 years old as first priorities. Expansion of the Automatic Meter Reading (AMR) program throughout the City may also dictate the order in which meters are replaced.

In addition to following American Water Works Association guidelines, PU will create (as necessary), update, and maintain policies and procedures for meter replacement. Based on a March 2016 internal test of ten random residential meters that were 17 - 44 years old, PU calculated an overall accuracy percentage of 96.55%. This indicates that meter accuracy for aging meters in Chesapeake may be better than that reflected in Exhibit #4, and the annual loss of revenue by not replacing meters is less than that forecast in Exhibit #5.

The Director currently meets with Human Resources department representatives monthly to discuss personnel issues of all types. The difficulties in attracting and keeping entry level employees has been a topic of discussion over the last year, and we will continue to work on this issue.

The modernization of the M&O facility will also assist with aging meters. An up-to-date facility will make testing, storage, and issuance of meters more efficient, and it will be more attractive to new employees, helping us to compete in the workforce.

**D. 2. Large Meter Testing**

**Finding – The M&O Division had not consistently performed annual testing of large (3” to 10”) water meters. In addition, the annual testing process was not documented in the division’s policy and procedures.**

*Recommendation – PU should develop and implement a large meter testing program that can be accomplished with the staffing level of the Water Service section. Additionally, the Department should consult with Human Resources to evaluate the cause of the continual vacant positions in the Water Service Section and develop a plan to mitigate this issue. Further, large meter testing policies and procedures need to be documented.*

**Response:**

Currently Public Utilities has over 800 large meters (> 2”) that are tested by two staff members in Water Services. These two staff members also perform other duties including large meters repairs, register or touchpad repairs, 1½” - 2” meter change-outs, special meter tests, and numerous large meter re-reads. With current staffing, and as commercial development continues to grow, PU will be unable to meet the goal of testing large meters annually. Public Utilities is requesting an additional two positions over the next three year budget cycle specifically to assist with large meter testing. To annually test approximately 800 large water meters, two 2 man crews would be needed.

Recognizing that we are unable to test all meters annually as desired, the meter testing crew has been performing tests by boroughs rather than age, in order to increase efficiency. Public Utilities created a list

---

of all meters that had not been tested in 4 years or more, as referenced in Exhibit #7. Many of these non-tested meters are in the process of being checked currently to reduce these numbers to a more manageable level. PU will continue to investigate all large meters and determine any issues and make recommendations or take necessary actions as required.

Although we are not meeting the goal of testing all large meters annually, a large amount of meters that we have tested beyond the one year mark have met AWWA standards without having to replace or repair them. AWWA has no real recommendations as to when large meters are to be replaced. Public Utilities' process is to maintain the current inventory in place as long as the meter is running accurate (within AWWA guidelines) and as parts are still available. If we cannot repair or refurbish the meter, then the large meter is replaced.

Vacancy levels in Public Utilities' Water Services section have remained high for several years. The low salary for laborious work performed in this section is thought to attribute to vacancy levels. Temporary employees have been used to fill entry level positions. While temps have helped somewhat in filling the void, we have only been minimally successful in hiring and retaining these employees as full time city staff. Public Utilities will continue to meet monthly with Human Resources' representatives to discuss continuing vacancies and retention of employees. In addition, an up-to-date facility will be more attractive to new employees, helping us to compete in the workforce.

Public Utilities concurs on the need for a written policy and procedure for large water meter testing and will continue to work on updating and adding policies and procedures. To perform some of the recommendations by this audit, CIS & Maximo will need to be integrated or some type of new program may need to be implemented with the assistance of the IT department. Additional personnel, equipment and tools are needed to have a successful large meter testing program.

### **D. 3. Meter Tracking**

**Finding – The Meter Shop did not have written procedures for tracking new and refurbished meters.**

*Recommendation – The Meter Shop should develop written procedures for tracking new and refurbished meters.*

#### **Response:**

PU currently does not have a specific written procedure for tracking meters, but meters are tracked. All new meters purchased by the City are entered into the Customer Information System (CIS), which maintains the key meter information by individual meter number. The physical location of meters are also documented within CIS, as well as the meter number tied to that location. Large batch purchases are entered into CIS by the IT department. Meter purchases for meter sizes larger than residential meters are entered manually in CIS by the Meter Shop Supervisor. Maximo, which is used for work orders, contains meter location and number, but requires a search by address, as meter information in Maximo is not updated due to limited staffing and the fact that it is not absolutely necessary.

New meters are issued to both Customer Service and M & O divisions of PU. Currently, refurbished, lead-free water meters from M & O are only used by Customer Service and tracked in CIS. Maximo is unable to track refurbished (used) meters at the current time; therefore, M & O does not use or track them.

Pending funding, Public Utilities will work with IT to develop a module/upgrade in Maximo to allow for the tracking of revolving inventory.

Public Utilities concurs that water meter policies and procedures need to be documented. Currently two divisions handle water meter tasks. The consolidation of all staff involved in water meter tasks is currently being evaluated.

To maintain meter information as recommended by audit, additional staff would be necessary to maintain tracking in a more efficient and productive manner. Any programs or software changes would also require funding to implement and assistance from the IT department.

#### **D. 4. Inventory Process**

**Finding – PU’s inventory process was cumbersome, lacked adequate segregation of functions, and inventory counts in Maximo were not always accurate.**

*Recommendation – PU should take steps to streamline inventory processes, improve segregation of functions, and improve inventory accuracy.*

#### **Response:**

In March 2016, PU added a new Accountant I position to compliment staff, specifically to improve the separation of duties with M&O purchasing and warehousing functions. The position has been filled and the selected candidate works at the M&O facility adjacent to the storeroom and yard storage areas. A Separation of Duties matrix was developed and initiated in late March 2016 to differentiate storeroom and accounting responsibilities.

The Accountant I participates in the ordering of materials and performs periodic checks of inventory. This assures separation of duties and documentation of any variances observed. The Accountant I will also be assessing methods to improve control over Maximo inventory and streamlining the process between the M&O field site and the PU Accounting group at City Hall. PU will continue to work with IT to reduce the need for duplicate system entries and the integration between Maximo and PeopleSoft and to develop a means of tracking obsolete inventory. PU is currently testing an automated, paperless method to improve the invoice approval process.

The Storekeeper Supervisor along with several other PU employees participate in the Maximo User Group meetings. There are ongoing discussions regarding possible upgrades to the system to integrate with other systems such as CIS and PeopleSoft.

The modernization of the M&O facility will assist with the inventory process. An up-to-date facility will have the proper design for storage of materials inside the warehouse and outside storage for large items such as piping and bulk materials (sand, stone, topsoil, etc.).

#### **D. 5. Data Entry**

**Finding – The Water Services and Water Distribution Superintendents spent significant time performing data entry work.**

*Recommendation – PU should take steps to reduce the time necessary for performing data entry work.*

#### **Response:**

A new Data Control Tech II position for data entry is proposed in the FY18 budget cycle. So far, other operational needs have outweighed the needs for the data entry position. Other changes have been made with existing personnel to reduce the burden on the superintendents. A meter technician position was converted to an Office Assistant I, who performs significant data entry. Additionally, Crew Leaders and General Supervisors have been equipped with field laptops with data connections to be used in the field to input information into the Maximo asset management system. This can be performed on the job site,

---

significantly reducing office time for these supervisors. New tablets were ordered and are being issued this summer to Crew Leaders and Supervisors to facilitate field data entry.

One superintendent along with several other PU employees participate in the Maximo User Group meetings. We are evaluating possible upgrades to the system to integrate with other systems such as CIS and PeopleSoft.

#### **D. 6. Work Orders**

**Finding – PU’s Water Service did not utilize Maximo to track all elements of work order completion.**

*Recommendation – PU should contact Public Works and Information Technology to determine whether the “workaround” solution they were using could be used by the Water Service.*

#### **Response:**

Public Utilities Water Service section does not utilize all the functionality of Maximo with regard to tracking temporary employee time for work orders. Although this information is helpful, it is not critical unless we are performing a job for which we will send an invoice for reimbursement. With very limited staff (currently 8 vacancies), tracking this information for non-bill jobs is not worth the time it takes.

Temporary workers have been used as we try to fill our vacant positions with permanent staffing. Although tracking time for temporary employees would be beneficial, the turnover for these type of employees would create additional burdens on our IT department entering and removing temporary employees on a consistent basis. If software changes are needed, funding would be required to implement any changes in CIS or Maximo.

The ultimate solution is to fill vacant slots with full time regular employees instead of temporary employees. PU is working with HR to make this happen. PU has monthly meetings with HR representatives to discuss open positions along with other personnel issues. In the meantime, PU will contact PW and IT to determine if the workaround solution will work for PU.

#### **D. 7. GIS**

**Finding – PU was not optimizing its use of GIS to consistently record reliable and complete information of the water distribution piping and components.**

*Recommendation – PU should optimize its use of GIS to consistently record reliable and complete information of the water distribution piping and components.*

#### **Response:**

While we do not currently use our GIS system to its full capacity, we are making progress on getting our data more up to date in the GIS. This will start with getting accurate GPS data (6 inch accuracy) for all surface hardware- manholes, fire hydrants, meter boxes, cleanouts, valves, etc. This will provide a 90% solution for the physical location of all of our buried assets, excluding depth information. To facilitate this process, we purchased one field GPS units this year and plan to purchase one more in FY17 to capture more data. This effort involves GPS’ing more than 150,000 unique surface assets; this is a 20-year data gathering effort.

GIS is not the source document for what exists in the ground in the water and sewer systems. It does not contain the details that as-built drawings contain; these details are essential to see specific pipe

---

configurations. As-built information is typically accessible through the GIS database (through the use of hyperlinks).

As development continues in the city, water and sanitary sewer assets are constantly being added to the PU GIS layers. As new piping is added, materials of construction and size are being recorded in GIS. As time allows and the GIS system matures, materials of construction and size are being updated where they are not already available. Records of water and sanitary sewer repairs are stored in the asset management system software (Maximo).

#### **D. 8. Warehouse Conditions**

**Finding – Physical conditions at the PU warehouse and outside storage area needed improvement.**

*Recommendation – PU should work with Facilities Management to make necessary repairs.*

#### **Response:**

A new combined Public Works (PW) Public Utilities Operations facility has been planned for several years. Because it has been in and out of the planning and design phases, it has not seemed prudent to spend funds maintaining facilities that will soon be razed and removed. As a result, only minimal funds have been spent maintaining the physical features at the M&O facility on Executive Drive. While the new facility location is being determined, PU will work with Facilities Management to make suggested essential repairs.

The addition of new sheltered racks will have to be weighed against the possibility of the combined Operations facility project moving forward. It would not be prudent to construct new facilities at this location if a move was forecast within the next few years.

The scrap piping, ductile iron and a small amount of cast iron, are frequently used for bollards around fire hydrants, meter vaults, and other aboveground infrastructure to avoid the need to purchase bollards. Materials containing lead are not used in the water system. Some of the ductile iron pieces are also used for repairs, large meter assemblies or required short pipe lengths for branch lines to fire hydrants. Neither ductile nor cast iron materials contain lead, for the simple reason that any lead boils out of the iron in the manufacturing process of the cast and/or ductile iron pipe (and has done so for the manufacturing process for iron pipe for over 100 years). Additionally, any cast or ductile iron pipes we use in the water system are lined with cement mortar. The metal surface does not come into contact with the water except for a very small area at joints, fittings, and connections. Lead free is defined as not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures. The wetted surface of these pipes is almost exclusively cement mortar.

To help prevent leaks and water intrusion, the storeroom had new shingles and gutters installed in the last few years. PU management has neither witnessed nor heard of the use of facial masks by storeroom staff in the storeroom other than in this report. Facilities Maintenance has offered to PU storeroom staff on several occasions their services for conducting an investigation of proposed mold, pending PU's movement of inventory materials. The directive to clear the inventory materials will be issued in 2016 to allow Facilities Maintenance to perform proper investigations of discolored wall and ceiling areas.

#### **E. Customer Information System (CIS)**

##### **E. 1. CIS Reconciliation**

---

**Finding – Reconciling differences between the Customer Information System (CIS) and the Hampton Roads District system (HRSD) were not researched and cleared in a timely manner.**

*Recommendation – The CIS and HRSD systems should be reconciled daily and all reconciling items be researched and cleared in a timely manner.*

**Response:**

The issues cited for the audit have been resolved, and systems established to ensure that any future issues are quickly identified. CIS and HRSD systems are reconciled daily and any differences are identified, researched, and cleared in a timely manner. The PU IT Systems Analyst is much more comfortable with the system, and Accounting and Customer Service are working together when problems are identified. We have established a much better understanding of each of our software systems, the interfaces between them, and the interaction required between departmental teams.

**F. Customer Service – Cash & Settlement - Billing**

**F. 1. Billing**

**Finding – Customer billing was behind by over 2,500 service orders for several months during 2015. This created multiple instances where customers' bills were skipped and then "caught up" by being billed for four months on their next cycle.**

*Recommendation – PU should ensure that service orders, "rereads," and other exceptions are handled in as expeditious a manner as possible.*

**Response:**

The difference between the number of Tab Rereads (internally generated) and the reported 2,500 open service orders may be from two separate reports. The numbers are measuring different things. There is a Smartlist (CIS generated report) that identifies the total number of open service orders in CIS. This includes customer requested rereads, Tab Rereads, and all other types of service orders. This report has exceeded 2,500 open service orders that the division is placing great emphasis in completing.

The audit states that "delays in processing service orders timely had several causes that combined to create the backlog. First, the service order reports were being run by Billing and Customer Service using different parameters that resulted in each section having different numbers for outstanding service orders. Second, the Billing section has a long term supervisor retire in 2015. This retirement demonstrated that Billing section personnel were not cross trained in a sufficient manner to help with the work load during the staff shortage. Third, the computer system was upgraded during 2015. The system operated well in test mode but when it went live there were significant slowdowns in data processing creating detrimental effects on the processing of bills and service orders. Forth, during 2015, one of the meter readers had a personal issue that resulted in more errors than normal on his routes."

The impact to billing should be ranked as:

- 1) Retirement of a long-term supervisor. The retiring employee retired in July, 2015. This supervisor was also the highest production employee in terms of service order completion. Additionally, this employee possessed a knowledge of billing whereby she could look at an account and quickly determine the likelihood that a problem or error existed with a meter reading. This is a previous knowledge experience that evolves over time and is not something that cannot be cross-trained. It comes with experience. A new employee was hired in September, and her training began immediately. The new employee proved to be a very quick learner; however, the knowledge experience described above is an on-going process that will only come with time.

- 2) CIS upgrade and server issues. The software upgrade was put into Test version and no program or server issues were found during multiple testing sessions that occurred in March as well as August 2015. The upgrade was installed into production on September 13, 2015. Beginning September 14, we found severe delays from the server and billing errors began to appear on bills. Billing was halted on September 24 to prevent billing errors and it was discovered that our upgrade put into production was missing a software patch designed to prevent the errors we were experiencing. Additional testing had to be performed to ensure that no billing errors existed and we were able to resume billing on September 29. By this time, three cycles that were scheduled to be billed were delayed which caused significant backlog increases.
- 3) Meter misreads. Everything in billing is contingent upon the accuracy of the meter readings.
- 4) Cross-Training. We identified various types of work such as review and approval of leak adjustments and completion of non-billing service orders and have cross-trained clerks outside of the Billing Section as well as other support staff members to complete these responsibilities. This has enabled our billing staff members to focus on billing and account corrections more expeditiously.

We have implemented changes to how we assign cycles for billing. We formerly had the responsibility for preparing a cycle for billing and completing Tab Rereads assigned between two individuals whom took turns between alternating months. Both employees have been reassigned to work on billing cycles and completing Tab rereads jointly. Other support people within Customer Service have been cross-trained to complete non-billing service orders to reduce the backlog of other types of service orders.

A recommendation was made suggesting that customer notices be developed to send to customers when there is a delay in billing their account. Letters have been drafted for this purpose, were mailed to the impacted customers in the circumstance described in the Audit, and will again be employed if significant delays occur in the future.

“Finally, PU and IT should determine the cause of the processing slow down and remedy the problem.” This analysis is ongoing and significant progress has being made. We have now attained a CIS system speed that matches what we experienced before the September 2015 upgrade. The primary factors which allowed us to reestablish our former performance are:

- 1) Installing solid state drive storage.
- 2) Database synchronization between the primary and secondary databases.

At the same time as we upgraded the CIS system, IT upgraded the City’s computer network hardware including improved security. This design had not been implemented by any other Cogsdale customers, nor had it been present when we were testing the new software. While this contributed to our performance reduction, we determined we did not want to make any changes to the security structure lowering our data security.

Cogsdale is also improving its software performance.

## **F. 2. Cash Handling and Settlement**

**Finding - The cashiering process in place for PU Customer Service was inefficient and was not designed to promote good customer service. In addition, procedures for cash handling, petty cash (p/c) and settlement processes did not sufficiently address cash handling, petty cash, settlement, internal controls, and the safeguards over assets needs to be enhanced.**

*Recommendation – PU Customer Service should develop and document cash handling, cash settlement and petty cash processes so that cash is adequately safeguarded. In addition, PU customer service should*

---

*develop an ongoing oversight and monitoring process to ensure adherence to cash handling and cash control procedures.*

**Response:**

During this review period we have taken steps to increase our internal controls. Acknowledgment of this concern was evident when the decision was made to add a position to this area in customer service. In October 2015, we hired a former bank manager to further drive changes needed to our internal controls. Since her arrival, we have made many changes.

A new safe has been installed. In line with recommendations, the safe is bolted to the floor. It also has a combination that has been split between various staff members. All access to our safe requires two parties to be present and documentation of entry. The safe also includes a deposit slot where items dropped can only be retrieved by opening the safe (under dual control) and unlocking a box within the safe as an added safeguard. Based on findings in the report, the safe's dual control combination will be changed within 30 days of any employee's departure.

We have also reduced the number of cashier funds (bags) from five to three. Additionally, the drawer's balance was increased from \$45 to \$75. This change allows our cashiers to request change less frequent. Though we only have two workstations for cashiers, the third drawer is necessary to avoid down time in situations where a change in cashier is needed during the day (part time employee).

The \$75 cash drawers are counted daily under dual control. The contents are placed in a tamper proof plastic bag, and they are dropped in our safe each evening between 4-5 PM. Since this process was implemented, each drawer is used at least once during a 30 day period. Additionally, the accounting division will verify funds within the safe on a monthly basis.

The review also referenced using a tamper evident bags to drop cashier overages exceeding \$500.00. Since the initial review, we implemented the usage of single pouch tamper evident bags in these cases as well. Many cashiering systems include functionality to notify the cashier when their drawer has exceeded specified limits. However, the cashiering system provided by HRSD does not include this function; therefore, staff heavily relies on a manual process.

Handling the \$200 change fund under sole control is challenging since all clerks assists customers, but the funds will get counted daily. Calculator tape will be kept in the drawer until the monthly accounting review is conducted. A log will also be created to show the names of the two parties who count it, date, time, and the amount counted. It will be kept in the safe drawer box.

Overages will be processed to our over/short fund by the following day to give adequate opportunity to research the cause. There are also some practical concerns as we are unable to process transactions to our Treasurers system after 4:30 PM. If an out of balance condition exist our HRSD reconciliation may exceed 5:15 PM.

We are reviewing recommendations to process the meter test check as they are received. However, checks for meter test are held for reasons when a meter test out of tolerance and funds get returned to the customer. If they are processed upon receipt we must make preparations for providing electronic refunds. Currently, our CIS/HRSD interface does not support this process.

We have created a change exchange form to document cashier fund exchanges.

We are also reviewing the recommendation to have pay in voucher processing and reconciliations performed by separate parties each evening. End of day cashiering related reconciliations must be

---

managed in conjunction with our ability to address customer concerns relative to normal customer service disputes and late day interruption of service. These additional duties reduce the number of clerks available to assist customers. We intend to address these issues through two new positions (already approved for 2016-2017) that will assume these responsibilities as well as take an active role in many of the recommendation provided in this review. The division is also reviewing current staff roles with a plan of action to restructure two areas of Customer Service and Collections into one consolidated area, increasing team flexibility.

## **G. Water Production**

### **G. 1. Nuisance Birds**

**Finding – The Water Treatment Plants’ design and operation attracted nuisance birds that caused corrosion and potential spread of disease to workers and visitors around the facilities.**

*Recommendation – Public Utilities should work with the appropriate federal and state agencies to address the issue.*

#### **Response:**

Many forms of goose control were deemed to not be appropriate for our water treatment facilities on Battlefield Blvd. or Western Military Highway. Earlier this year, DPU purchased decoy coyotes which function to scare away geese and other nuisance birds from our water treatment facilities. To date, it appears these coyotes have been effective. We are currently evaluating bird netting and other systems to reduce or eliminate pigeon access to the water treatment area. Note that the majority of our water at the Northwest Water Treatment Plant – that treated by our reverse osmosis units - is treated without passing through the open-air component of the conventional treatment process. Additionally, the open air component is relatively early in the water treatment process, and the follow-on treatment resolves any issues that may be temporarily created by the birds’ presence.

## **H. Contracts**

### **H. 1. Contracts**

**Finding – Contracting practices for Public Utilities could be enhanced.**

*Recommendation – PU should work with Purchasing to enhance its contracting practices.*

#### **Response:**

Public Utilities requested and was approved to hire a new senior engineer to serve as a Capital Project Manager as part of the FY17 budget. This individual will bring management of our capital program under one supervisor. Standardizing and improving our contracts is one of this individual’s specific objectives. This individual will also provide quality control over our capital contracting process. Most of the identified situations and recommendations are relevant to capital contracts, and will be under this individual’s purview.

DJ

# **APPENDIX B**

**PRO RATA**

**FLOWCHART**

**SIMPLIFIED VERSION**



# Pro Rata and Connection Fee Process

**200  
Total  
Projects**

Initial Water Sewer Project  
Completed/  
Calculation Made

Pro Rata  
or  
Connection Fee?

Pro Rata Payments  
from Project Users

Pro Rata  
Calculation  
Collection  
Payment

Connection Fee  
Collection  
+  
Payment (capped)

Connection fees  
Payment from  
Connectors

## Issues

- No means to ensure previous pro rata payments made
- No segregation of functions (Engineering handles everything)
- Some Pro Rata fees billed were not collected
- Payment recorded as revenue rather than liability
- Other Accounting and Management issues

Pro Rata  
Accounting

Payment to First  
Developer

## Issues

- Accounting Division didn't know intent of developer
- Fees collected over multiple years but paid out in one year
- Difficult accounting for individual connection fee payments
- Other Accounting and Management Issues

Connection Fee  
Accounting

Payment to First  
Developer

## Issues

- Procedure not updated since 1984
- Last updated project list 7/6/2009
- No payment information for 97 of 200 projects (48.5%)
- Calculation took 10-12 staff days
- Initial Developer didn't always send cost information
- Other Accounting and Management Issues



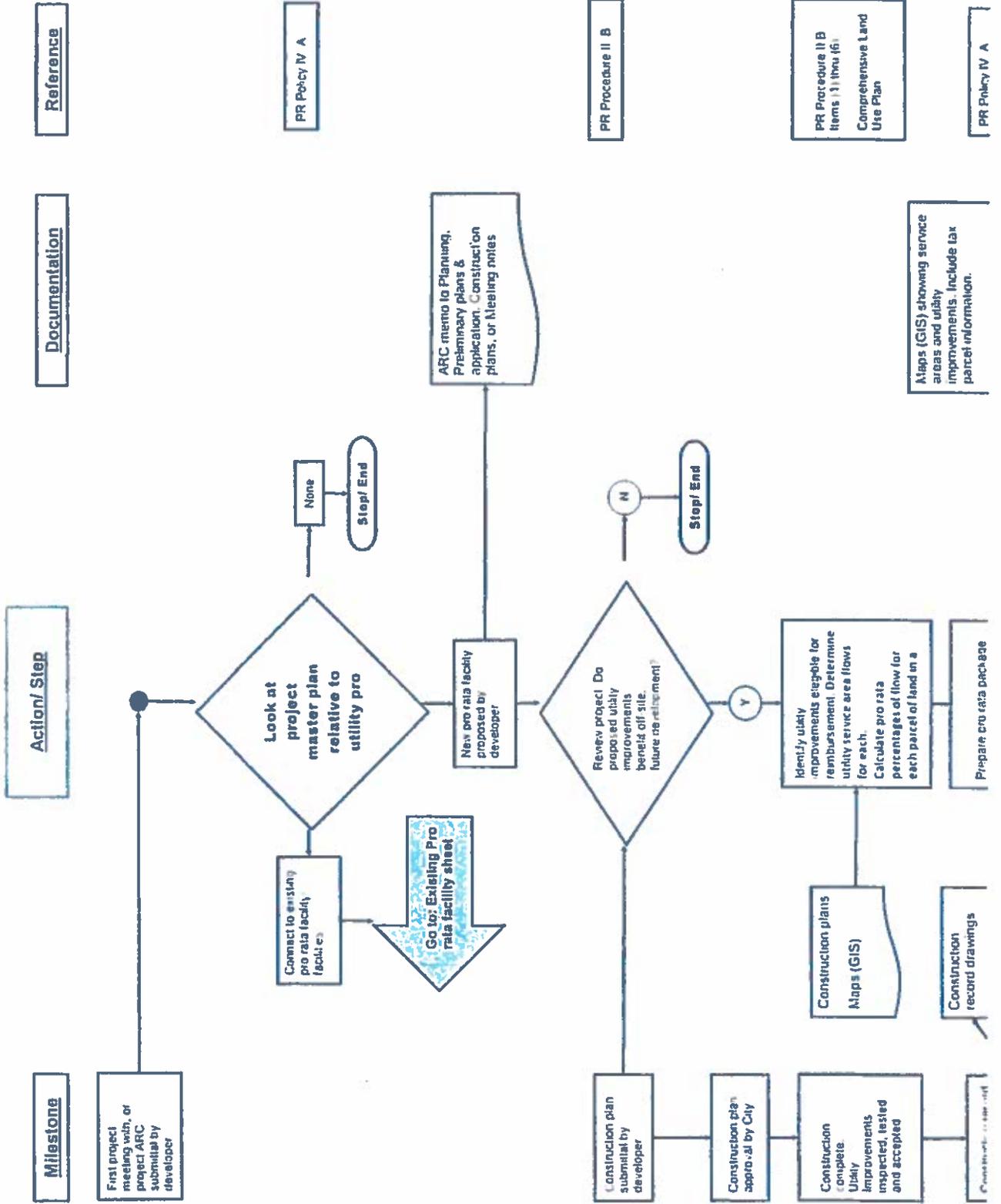
# **APPENDIX C**

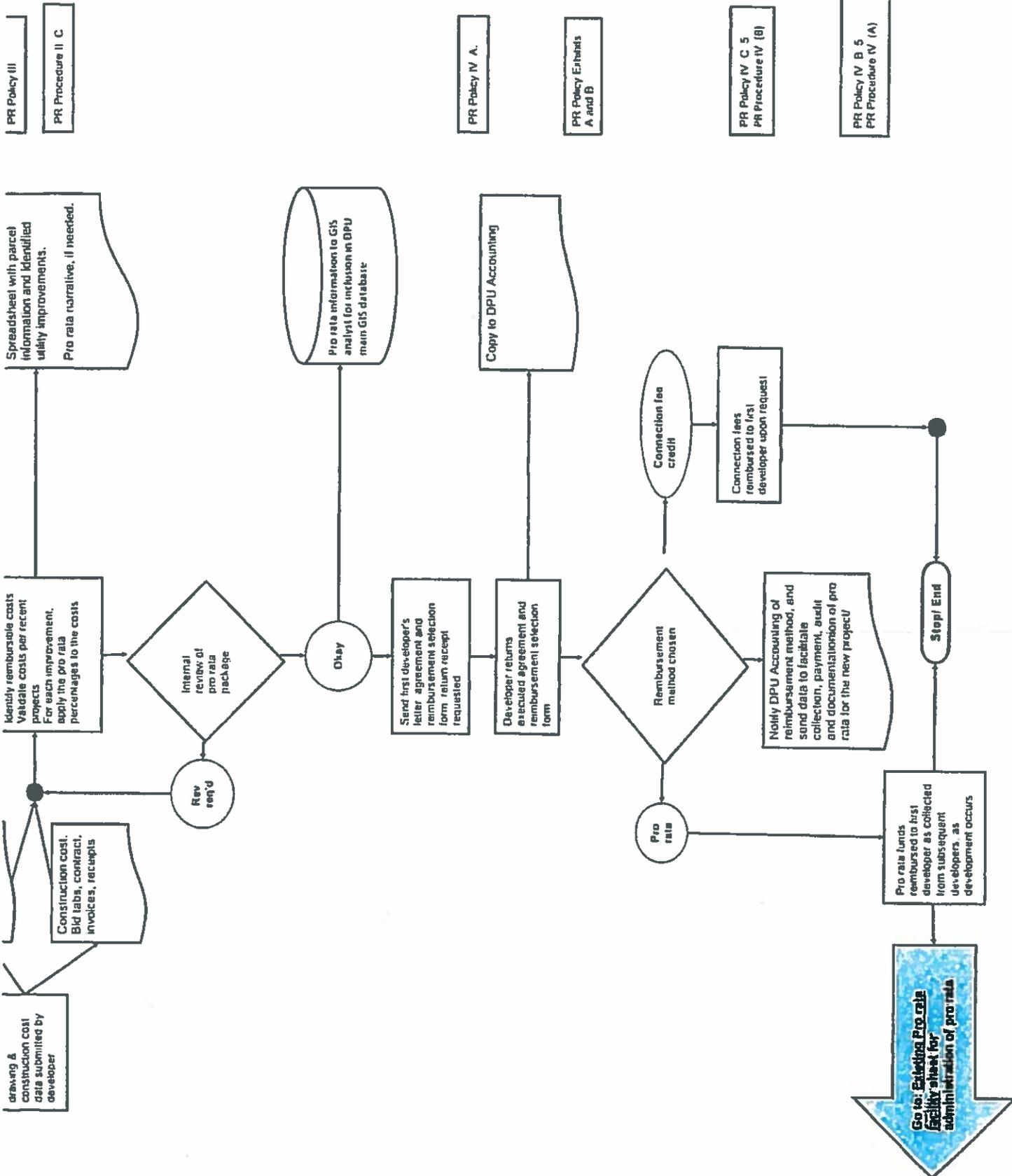
## **PRO RATA**

## **FLOWCHART**

## **DETAILED VERSION**

# Chesapeake DPU flowchart for a NEW PRO RATA FACILITY by a First Developer





PR Policy III

PR Procedure II C

PR Policy IV A.

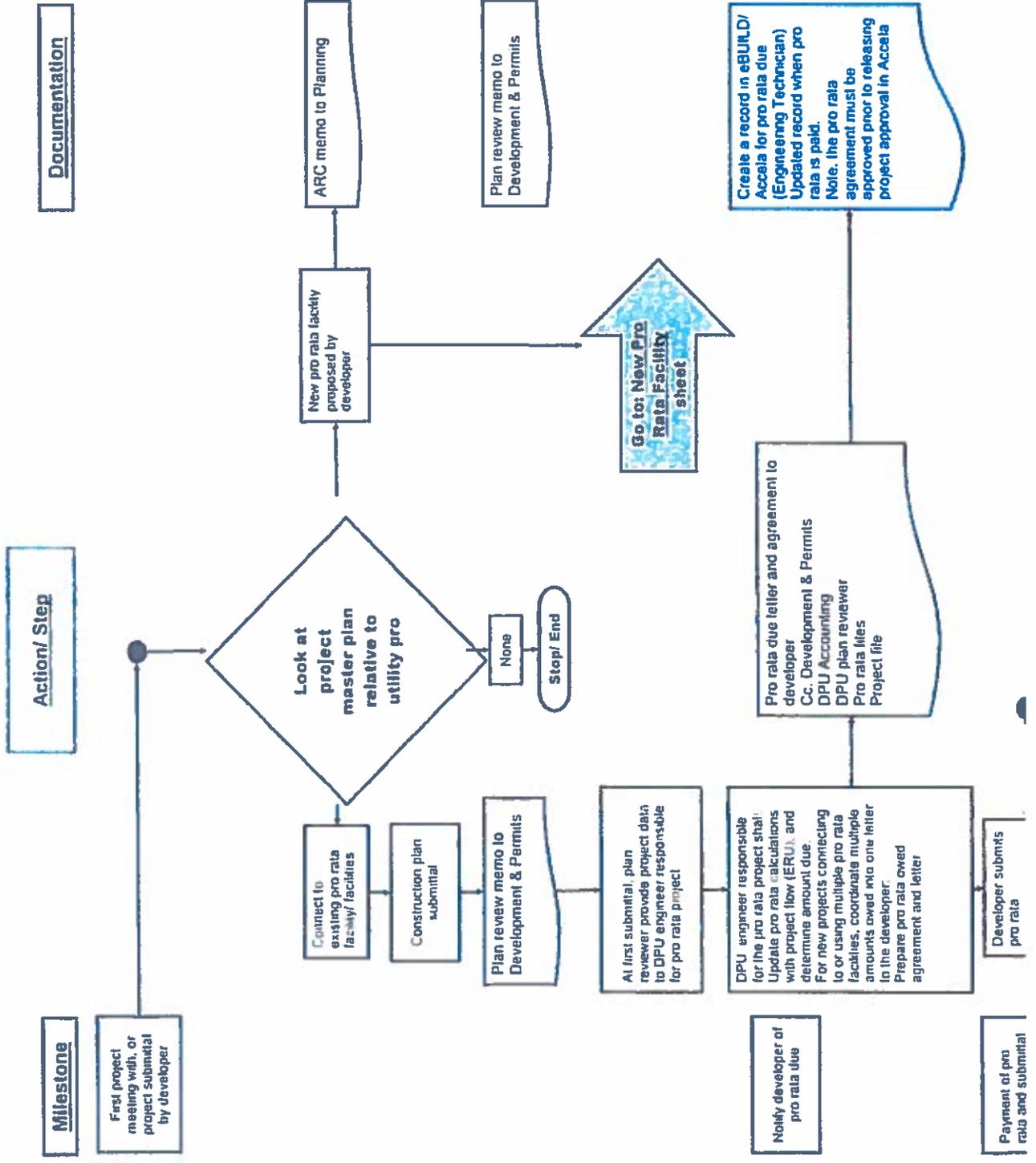
PR Policy Enhancements A and B

PR Policy IV C 5  
PR Procedure IV (B)

PR Policy IV B 5  
PR Procedure IV (A)

**Go to Existing Pro Rata Facility sheet for administration of pro rata**

# Chesapeake DPU flowchart for an EXISTING PRO RATA FACILITY by a Subsequent Developer



**Milestone**

FIRST project meeting with, or project submittal by developer

**Action/ Step**

**Documentation**

Connect to existing pro rata facility/ facilities

Construction plan submittal

Plan review memo to Development & Permits

At first submittal, plan reviewer provide project data to DPU engineer responsible for pro rata project

DPU engineer responsible for the pro rata project shall: Update pro rata calculations with project flow (ERU), and determine amount due. For new projects connecting to or using multiple pro rata facilities, coordinate multiple amounts owed into one letter in the developer. Prepare pro rata owed agreement and letter

Developer submits pro rata

Pro rata due letter and agreement to developer  
Cc. Development & Permits  
DPU Accounting  
DPU plan reviewer  
Pro rata files  
Project file

Create a record in eBUILD/ Accela for pro rata due (Engineering Technician) Updated record when pro rata is paid. Note. the pro rata agreement must be approved prior to releasing project approval in Accela

Look at project master plan relative to utility pro

None

Step/ End

New pro rata facility proposed by developer

ARC memo to Planning

Plan review memo to Development & Permits

Go to: New Pro Rata Facility sheet

Pro rata due letter and agreement to developer  
Cc. Development & Permits  
DPU Accounting  
DPU plan reviewer  
Pro rata files  
Project file

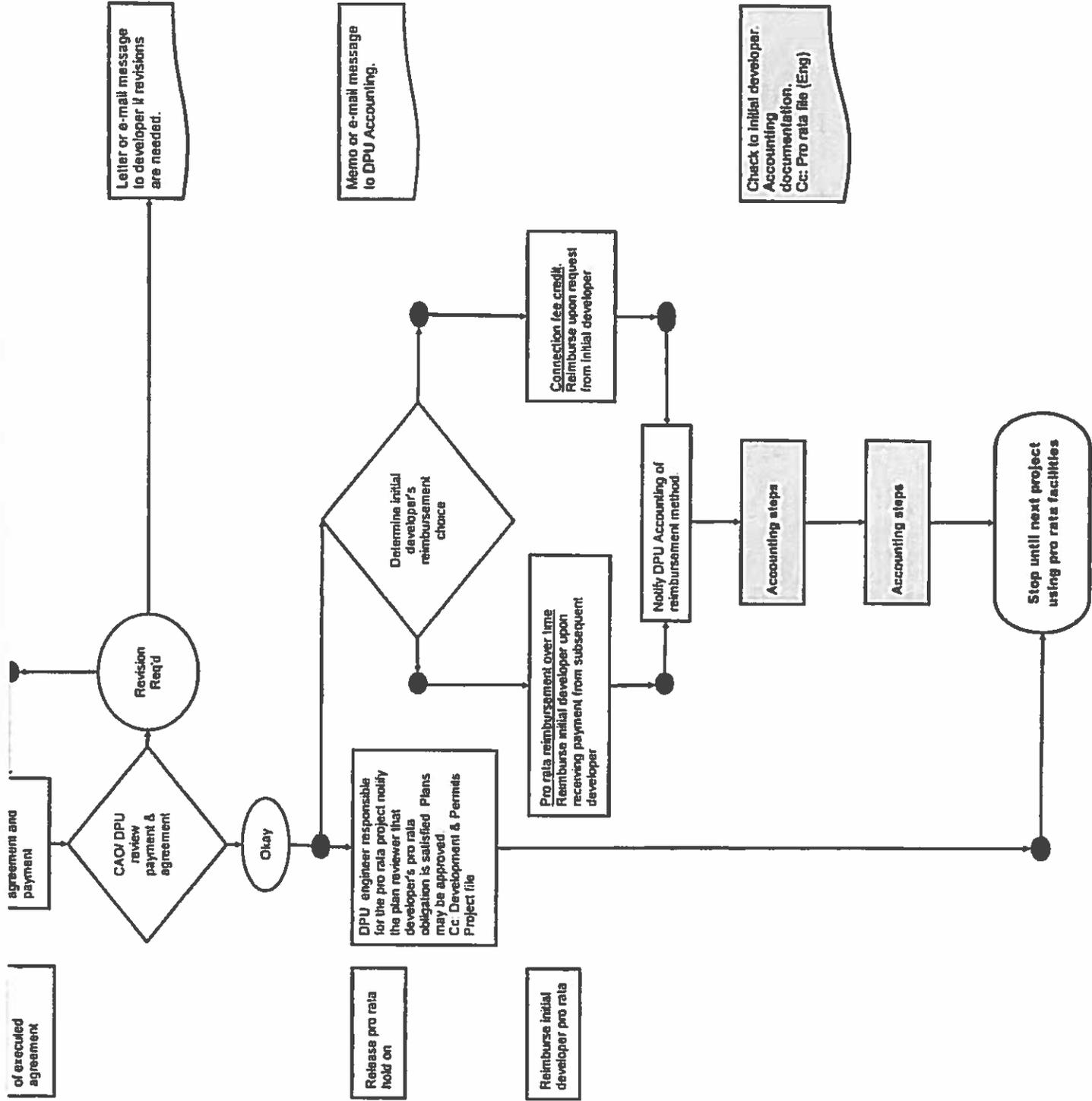
Create a record in eBUILD/ Accela for pro rata due (Engineering Technician) Updated record when pro rata is paid. Note. the pro rata agreement must be approved prior to releasing project approval in Accela

Payment of pro rata and submittal

Developer submits pro rata

Pro rata due letter and agreement to developer  
Cc. Development & Permits  
DPU Accounting  
DPU plan reviewer  
Pro rata files  
Project file

Create a record in eBUILD/ Accela for pro rata due (Engineering Technician) Updated record when pro rata is paid. Note. the pro rata agreement must be approved prior to releasing project approval in Accela



of executed agreement

agreement and payment

Letter or e-mail message to developer if revisions are needed.

Memo or e-mail message to DPU Accounting.

Check to initial developer. Accounting documentation. Cc: Pro rata file (Eng)

Release pro rata hold on

Reimburse initial developer pro rata

DPU engineer responsible for the pro rata project notify the plan reviewer that developer's pro rata obligation is satisfied Plans may be approved Cc: Development & Permits Project file

Pro rata reimbursement over time Reimburse initial developer upon receiving payment from subsequent developer

Connection fee credit. Reimburse upon request from initial developer

Notify DPU Accounting of reimbursement method

Accounting steps

Accounting steps

Step until next project using pro rata facilities

Revision Req'd

Okay

Determine initial developer's reimbursement choice

