DIVISION OF INSPECTOR GENERAL
Ken Burke, CPA
Clerk of the Circuit Court and Comptroller
Pinellas County, Florida

AUDIT OF PINELLAS COUNTY CAPITAL IMPROVEMENT PROGRAM AND INFRASTRUCTURE - UTILITIES

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REPORT NO. 2018-11
MAY 24, 2018

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CLERK OF THE CIRCUIT COURT AND COMPTROLLER
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May 24, 2018

The Honorable Chairman and Members of the Board of County Commissioners

We have conducted an audit of the Pinellas County Capital Improvement Program and Infrastructure for the Utilities Department based on a request from the Pinellas County Clerk of the Circuit Court and Comptroller.

Opportunities for Improvement are presented in this report.

We appreciate the cooperation shown by the staff of the Utilities Engineering, Maintenance, and Plant Operations Divisions during the course of this review. We commend management for their responses to our recommendations.

Respectfully Submitted,

Hector Collazo Jr.
Inspector General/Chief Audit Executive

Approved:

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Clerk of the Circuit Court and Comptroller
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Kevin Becotte, Utilities Engineering Division Director
Alan Bollenbacher, Utilities Maintenance Division Director

1988 - 2018

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INTRODUCTION

Abbreviations

ARV	Air Release Valve
BTS	Business Technology Services
CCTV	Closed Circuit Television
CIE	Capital Improvement Element
CIP	Capital Improvement Program
FDEP	Florida Department of Environmental Protection
FICA	Federal Insurance Contributions Act
FY	Fiscal Year
GAO	United States Government Accountability Office
GFOA	Government Finance Officers Association
GIS	Geographic Information System
ISO	International Organization for Standardization
OFI	Opportunity for Improvement
OMB	Office of Management and Budget
OPUS	Oracle Project Unified System
PM	Preventive Maintenance
SCADA	Supervisory Control and Data Acquisition
South Cross	South Cross Bayou Water Reclamation Facility
W.E. Dunn	William E. Dunn Water Reclamation Facility

Executive Summary

At the request of the Clerk of the Circuit Court and Comptroller, we conducted an audit of the Pinellas County Capital Improvement Program (CIP) and Infrastructure for the Utilities Department. The objectives of our audit were to:

1. Determine if the County's capital improvement and infrastructure plans cover the repair and replacement needs of Pinellas County.
2. Determine if the process for maintaining the County's infrastructure is efficient and effective.
3. Determine if planned, current, and completed capital improvement projects comply with the goals and objectives of the County's Capital Improvement Program.

We noted the methodology used to determine infrastructure repairs and replacements needs improvement. The Asset Management Program is not adequate to project long term infrastructure replacement needs and required funding. There are no active Master Plans for Utilities Water, Sewer, and Reclaimed Water to properly guide the CIP.

Our review of maintenance processes indicated some infrastructure and equipment have not been maintained timely. In addition, maintenance field processes need improvement to ensure data is accurate and complete.

Controls over data entered in Maximo, the maintenance and asset management system, are not adequate. There are inconsistencies when entering data in Maximo. In addition, internal customer invoices generated from Maximo are not accurate.

Staffing levels may not be adequate to ensure Utilities' infrastructure can be maintained, repaired, and replaced effectively to meet future goals and objectives of the CIP. In addition, employee and facility safety may be compromised for lone employees working on 2nd and 3rd shifts at the William E. Dunn Water Reclamation Facility.

Except as noted in the report, our review determined the County is meeting the goals and objectives of the CIP and infrastructure maintenance processes are effective and efficient. Our report contains 10 opportunities for improvement.

Background

Pinellas County Utilities manages the water and wastewater treatment facility operations, the monitoring and laboratory functions, and the maintenance of the distribution and collection systems.

The structure of Pinellas County Utilities includes the following divisions:

- Plant Operations
- Maintenance
- Water Quality
- Engineering
- Customer Services

The Plant Operations Division includes management of the Keller Water Treatment Facility, William E. Dunn Water Reclamation Facility (W.E. Dunn), South Cross Bayou Water Reclamation Facility (South Cross), and the Supervisory Control and Data Acquisition (SCADA) and security systems.

The Maintenance Division includes management of the North and South County Maintenance facilities and maintenance of water and sewer infrastructure. Utilities operates over 1,458 miles of sewer line in Pinellas County, maintains and operates over 289 pump stations, and there are over 22,297 manholes in the collection system.

The Water Quality Division monitors potable (drinking) water and wastewater systems, and the Engineering Division has oversight for pipelines, infrastructure facilities, utility relocation, and asset management.

The Customer Services Division includes:

- Billing and invoicing
- Revenue analysis
- Collections
- Integrated account services
- Call center
- Field operations (meter reading)
- Water compliance

The table below shows the number of accounts serviced by Pinellas County Utilities, as of December 31, 2017.

	Single Family	Multi-Family	Commercial	Total
Number of Accounts	90,921	15,277	8,073	114,271
Percent of Total Accounts	79.57%	13.37%	7.06%	100.00%
Number of Units		136,792	23,427	
Population Served*	204,572	180,565		385,137

* Based on 2007-2011 American Community Survey calculation of 2.25 persons per occupied single-family dwelling and 1.32 persons per occupied multi-family dwelling. Calculations provided by Pinellas County Planning Department in October 2013.

Pinellas County Utilities has recently been recognized for its dedication to providing outstanding utility services.

In 2015, Pinellas County was selected by the Florida section of the American Water Works Association as the recipient of the 2015 Water Distribution System Award for Division 7, which is composed of water providers with 70,000 to 129,999 service connections. The award provides recognition for exceptional potable water distribution systems in Florida.

In 2016, the W.E. Dunn Water Reclamation Facility won the Florida Water and Pollution Control Operators Association Facility Excellence Award for Region 4, which includes Pinellas, Pasco, Hernando, and Sumter counties. This award is given to facilities that provide outstanding service to the community through a superior track record of operation, safety, and dedication to professionalism and continuing education with the profession.

Wastewater/Stormwater Task Force

In October 2016, a Wastewater/Stormwater Task Force was formed to identify wastewater and stormwater solutions for the County. The Task Force includes State and County officials, 17 municipal leaders, seven local agency leaders, and three private utility systems, as well as staff representatives who serve on a Technical Working Group.

The Task Force's goals and opportunities include the following:

- Avoid and mitigate spills, overflows, and releases of sewage into the environment, particularly water bodies.
- Increase capacity and resiliency of collective sewer system and wastewater treatment infrastructure.
- Seek opportunities to address drainage and stormwater issues that impact the sewer system.

The Pinellas County website states that in response to common goals established at the first Task Force meeting, the Technical Working Group presented an initial action plan in January 2017. The action plan analyzed the events that led to the overflow situation during Hurricane Hermine and recommended approaches to avoiding future sanitary sewer overflows, including:

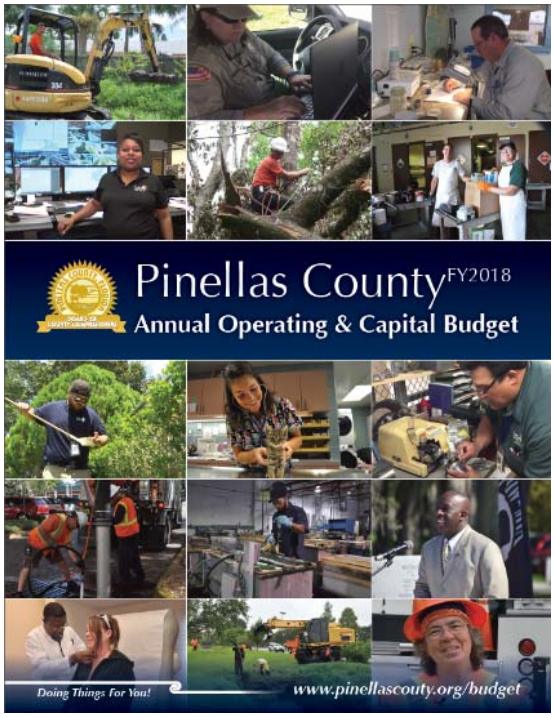
- Increasing wastewater treatment capacity at appropriate levels.
- Increasing wastewater storage capacity at appropriate levels.
- Reducing inflow and infiltration of stormwater and groundwater into the separate sanitary sewer system.

The Technical Working Group's recommendation merged the three solutions into a cohesive plan of action to reduce the greatest cause of inundation of the system, inflow and infiltration of stormwater and groundwater into the sanitary sewer system, while, incrementally increasing treatment capacity and/or storage capacity where applicable or appropriate.

Additionally, the Technical Working Group recommended implementing a countywide public dialogue program to increase education outreach and citizen engagement.

Leaders and staff will continue to meet regularly and track progress of the various joint initiatives.

Capital Budget



For the capital budget, all of Utilities funds are enterprise funds, or business-type activities, which offer goods and services to the citizens of the County and are intended to be self-supporting. Utilities is financed and operated in a manner similar to private business enterprises, where the intent of the governing body, Pinellas County Board of County Commissioners, is that the costs of providing goods and services to the general public on a continuing basis, be financed or recovered primarily through user charges, such as utility rates. Other County agencies supported by enterprise funds include the Airport and Solid Waste.

Utilities divisional management collaborates to provide input for infrastructure renewal and replacement needs, and with the assistance of the Office of Management and Budget (OMB), develop an estimated forecast for capital project funding for the County's Capital Improvement Program (CIP). Projects are also established based on input from citizens, public discussions, safety needs, planned rehabilitation cycles, grant funding processes, County staff and Commissioners, as well as the County's Comprehensive Plan, Community Redevelopment Area Plans, the Long Range Transportation Plan, and other County master plans.

Enterprise projects include:

- Physical Environment
- Transportation
- Non-Project Items

The other major fund for the capital budget is the governmental fund. The governmental fund's primary revenue source is the Penny for Pinellas tax.

Governmental projects include:

- Culture & Recreation
- Economic Environment
- General Government
- Human Services
- Physical Environment
- Public Safety
- Transportation
- Non-Project Items (Reserves for Future Years)

The tables below represent the Fiscal Year (FY) 2018 Adopted Capital Budget for the Water and Sewer Renewal and Replacement Funds.

The Water Renewal and Replacement Fund is used to account for capital improvement projects associated with the water system's facilities and other assets. Projects are funded from revenues generated by the system.

Water Renewal & Replacement Capital Budget	FY 16 Actual	FY 17 Budget	FY 18 Request
RESOURCES			
Beginning Fund Balance	$28,799,974	$37,163,790	$44,355,710
Revenues	$22,136,845	$22,167,380	$18,480,060
Total Resources	**$50,936,819**	**$59,331,170**	**$62,835,770**
REQUIREMENTS			
Total Expenditures	$12,757,081	$17,962,390	$9,751,040
Reserves	$0.00	$41,368,780	$53,084,730
Total Requirements	**$12,757,081**	**$59,331,170**	**$62,835,770**

The Sewer Renewal and Replacement Fund is used to account for capital improvement projects associated with the sewer system's facilities and other assets. Projects are funded from revenues generated by the system.

Sewer Renewal & Replacement Capital Budget	FY 16 Actual	FY 17 Budget	FY 18 Request
RESOURCES			
Beginning Fund Balance	$41,033,182	$47,887,480	$39,843,170
Revenues	$23,475,098	$18,021,340	$21,322,120
Total Resources	**$64,508,279**	**$65,908,820**	**$61,165,290**
REQUIREMENTS			
Total Expenditures	$15,465,783	$24,491,030	$32,654,030
Reserves	$0.00	$41,417,790	$28,511,260
Total Requirements	**$15,465,783**	**$65,908,820**	**$61,165,290**

Capital Improvement Program

The CIP is defined as follows:

> *"The Pinellas County Capital Improvement Program (CIP) is a comprehensive ten-year plan of proposed capital projects, intended to identify and balance the capital needs of the community within the fiscal capabilities and limitations of the County. It is primarily a planning document that is updated annually and subject to change as the needs of the community become more defined and the adopted projects move closer to final approval…*
>
> *The first year of the program is the basis for actual appropriations authorized by the Board of County Commissioners for capital projects when adopting the annual budget. The remaining nine years are a guide for the future development of the County's new and replacement infrastructure needs. The overall CIP schedule is formulated to reflect County priorities and needs by taking into consideration the County's goals and policies, the Pinellas County Strategic Plan, project urgency, the County's ability to administer the project, involvement of outside agencies, and the potential for future project funding."*

The objectives and goals of the CIP include the following:

<u>CIP Objectives</u>

- Preserve and improve the basic infrastructure of Pinellas County through public facility construction and rehabilitation.

- Maximize the useful life of capital investments by scheduling renovations and modifications at the appropriate time in the life-cycle of the facility.

- Identify and examine current and future infrastructure needs and establish priorities among projects so that available resources are used to the community's best advantage.

- Improve financial planning by comparing needs with resources, estimating future borrowing needs, and identifying fiscal implications.

CIP Goals

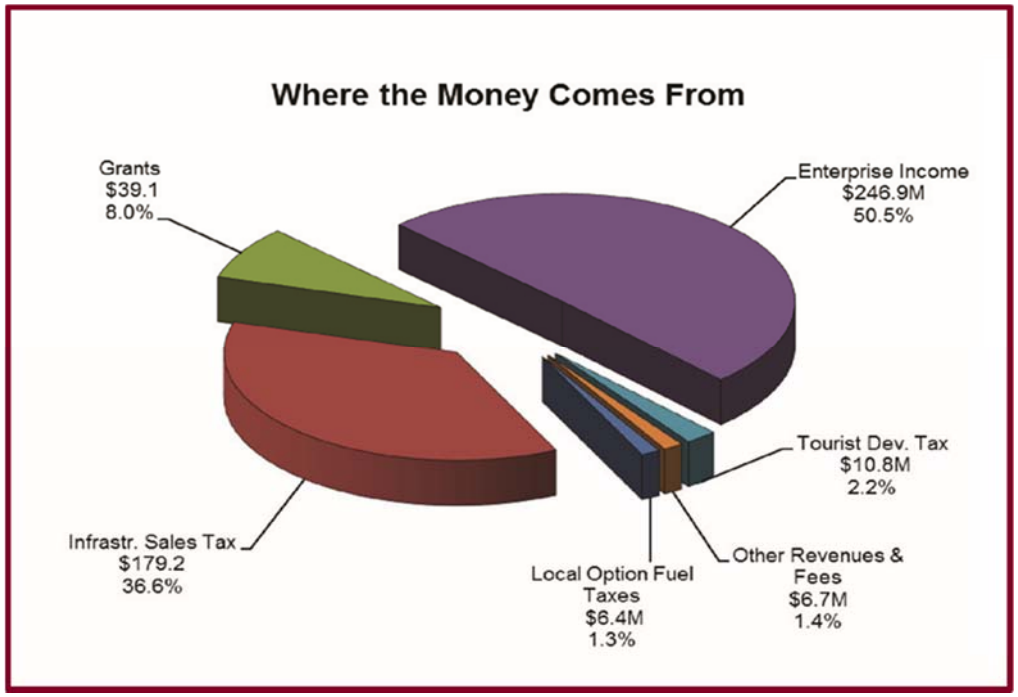
- Identify and prioritize infrastructure requirements based upon a coordinated needs assessment methodology. The CIP is a comprehensive guide for the allocation of financial resources and provision of public service for a ten-year period. The CIP serves as a "blueprint" for the future of the community. It is a dynamic tool, not a static accounting document. The CIP requires each department to look to the future, anticipate the need for projects, and justify that need. This requires the thoughtful integration of financial, engineering, and planning functions.

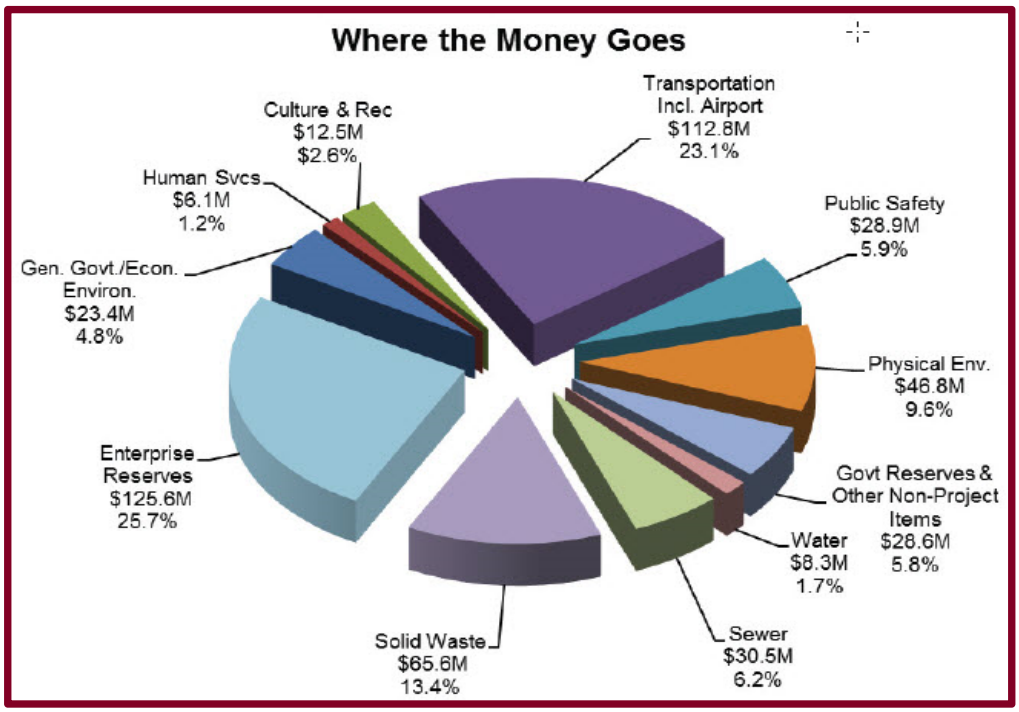
- Classify projects to ensure that those submitted for inclusion in the CIP are capital projects, not operating requirements. An accurate CIP relies upon the proper classification of projects. Requests which do not meet the specific criteria for a capital project should be considered in the operating budget.

- Identify the state growth management Capital Improvement Element (CIE) projects from the non-CIE projects within the CIP. The CIP and CIE are closely related, but they are not the same. Some projects within the CIP will also be contained in the CIE; these projects should be separately identified. The funding of these projects is a high priority and must be balanced against the non-CIE projects that are also in the CIP.

- Develop a realistic funding scenario for the CIP that identifies resources on a project specific basis.

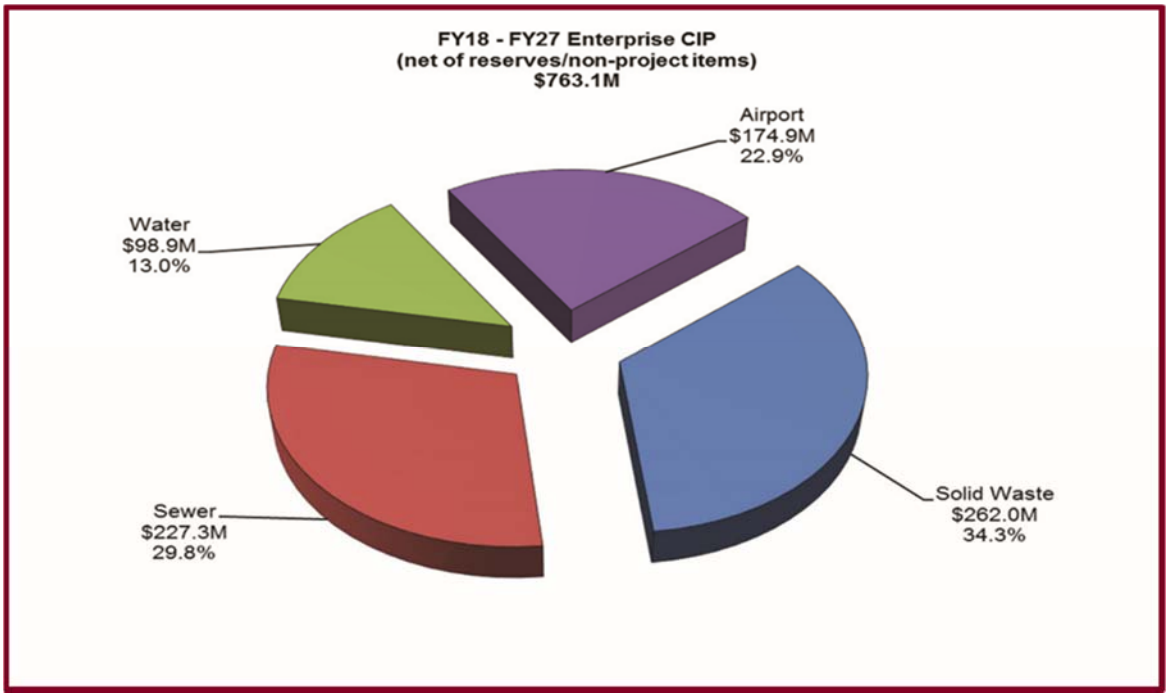
The pie charts below, from the current CIP, present an overview of how the FY 2018 capital improvement budget is funded, and where the funds are allocated. The total FY 2018 capital budget, including fund balances and reserves, is $489.1 million. The first year of the CIP, FY 2018, is the basis for actual appropriations authorized by the Board of County Commissioners for capital projects when adopting the annual budget.

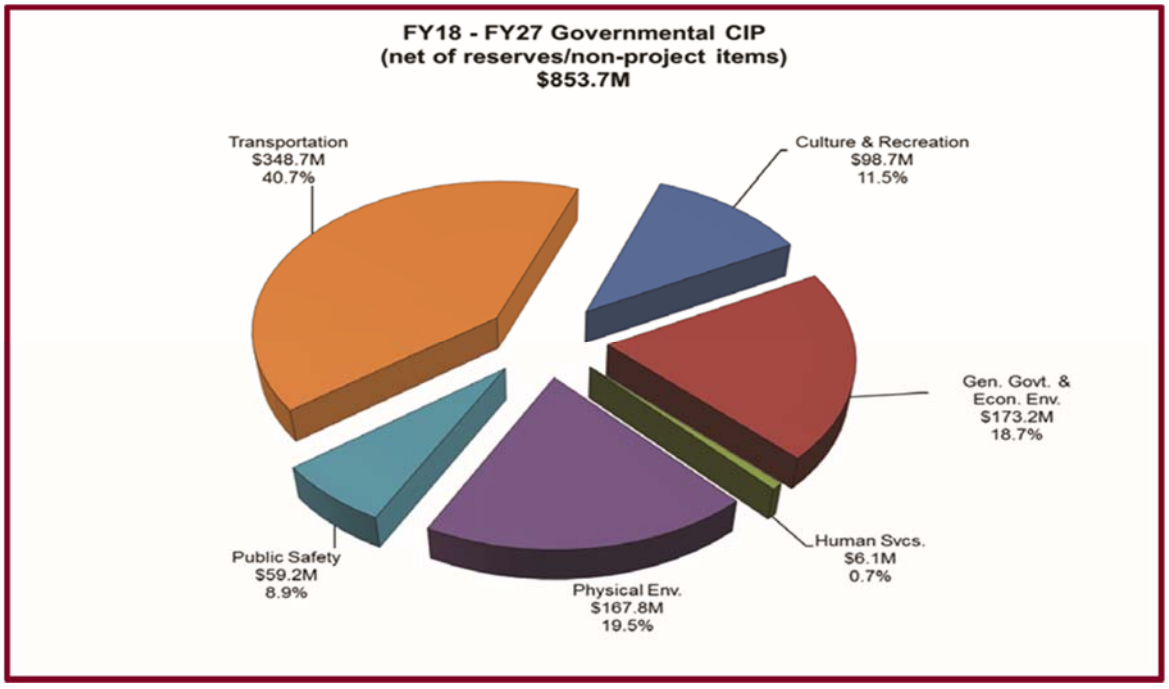




The total estimate for the ten year (FY 2018 – FY 2027) CIP is $1.8 billion. This amount includes both governmental and enterprise projects, as well as non-project items, such as reserves.

The pie charts below, from the current CIP, represent the enterprise and governmental funds CIP budgets respectively for the FY 2018 – FY 2027 CIP.





Best Practices

Asset management, master planning, and capital improvement programs are integrated processes to manage existing and future infrastructure needs.

The International Infrastructure Management Manual defines the goal of asset management as:

> *"Meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers."*

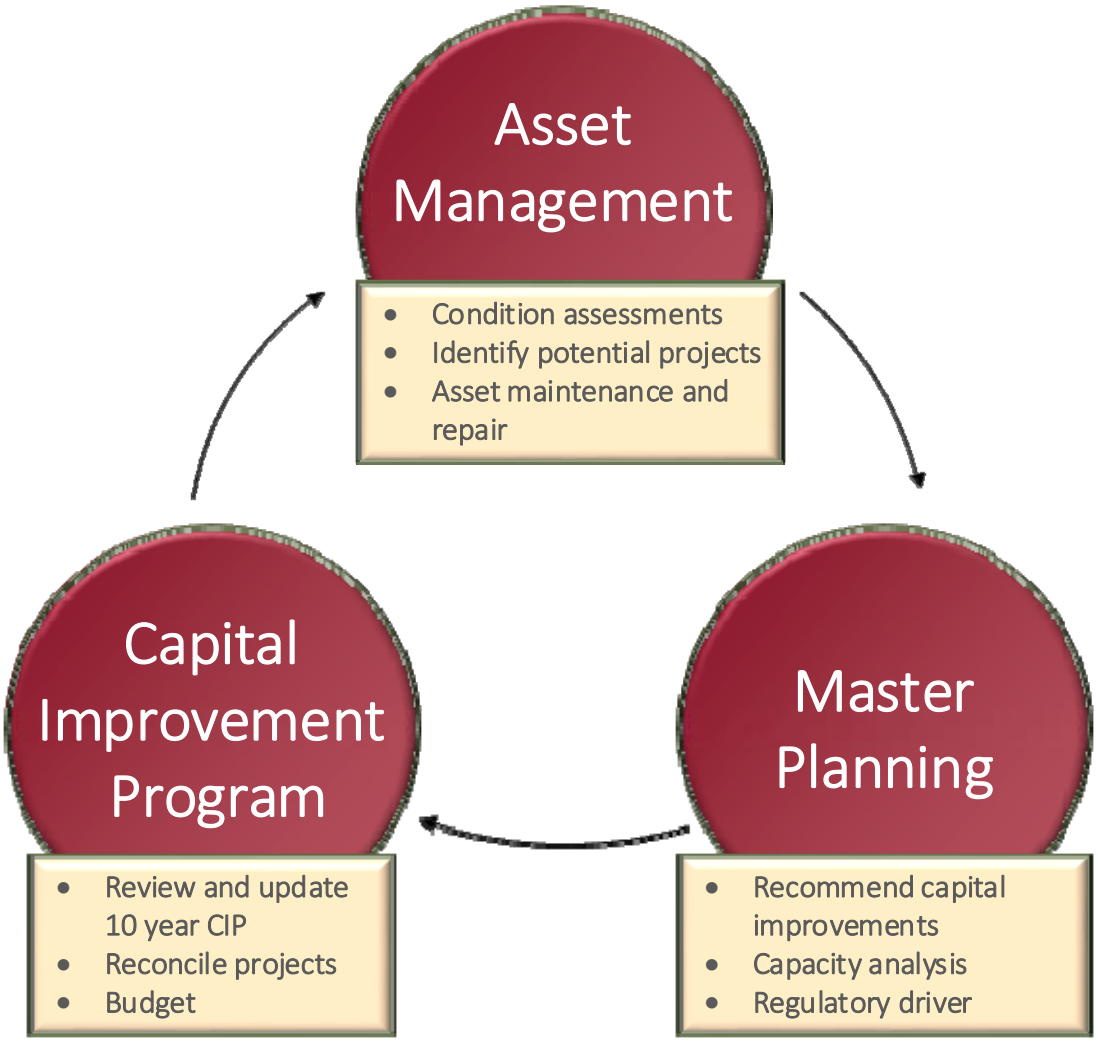
An asset management program has five major components:

1. Asset inventory and condition assessment
2. Level of service
3. Critical assets
4. Life cycle costing
5. Long-term funding strategy

A Master Plan is a comprehensive study "blue print" of infrastructure needed to maintain, improve, and expand system components. A Master Plan is used to support long-term utilities planning and life-cycle costs.

The County's CIP is a comprehensive plan of proposed capital projects, intended to identify and balance the capital needs of the community within the fiscal capabilities and limitations of the County.

The following diagram demonstrates a proactive process for determining present and future infrastructure needs. Our audit identified opportunities for improvement of the County's infrastructure planning process.


Asset Management
Condition assessments
Identify potential projects
Asset maintenance and repair
Master Planning
Recommend capital improvements
Capacity analysis
Regulatory driver
Capital Improvement Program
Review and update 10 year CIP
Reconcile projects
Budget

SCOPE AND METHODOLOGY

We have conducted an audit of the Pinellas County Capital Improvement Program and Infrastructure for the Utilities Department.

The scope of the audit included an evaluation of the methodology used to determine implementation of capital projects into the CIP, and the processes used to maintain, repair, and replace water, sewer, and reclaimed water infrastructure.

The audit period was October 1, 2013 through December 31, 2017. However, transactions and processes reviewed were not limited by the audit period.

During the audit, we performed the following:

- Interviewed Utilities Engineering, Maintenance, and Plant Operations staff to obtain an understanding of the processes used to maintain, repair, and determine infrastructure replacements.
- Performed on-site observations of in-progress and completed capital improvement projects.
- Observed pipe inspections with closed circuit television (CCTV) crews.
- Performed sample testing of preventive maintenance for assets/equipment to determine if maintenance was completed timely based on intervals set forth by best practices and County requirements.
- Reviewed the applicable utility regulations and compliance with those regulations.

OBJECTIVES AND OUTCOMES

The objectives of the audit were to:

1. Determine if the County's capital improvement and infrastructure plans cover the repair and replacement needs of Pinellas County.
2. Determine if the process for maintaining the County's infrastructure is efficient and effective.
3. Determine if planned, current, and completed capital improvement projects comply with goals and objectives of the County's Capital Improvement Program.

As a result of the audit, we determined:

1. The Asset Management Program does not contain the data necessary to fully guide future water, sewer, and reclaimed water utility decisions. An assessment on the condition of all infrastructure has not been completed, and therefore, funding for maintenance, repairs, and replacements cannot be properly projected for long term future needs. The current technology, and potentially the level of staff, are not sufficient to maintain the data necessary for an adequate Asset Management Program.

   There are no Master Plans for the South Cross Water Reclamation Facility and the sewer utility. The water utility and the W.E. Dunn Water Reclamation Facility Master Plans are outdated. Master Plans are necessary to provide accurate projections for the CIP. Master Plans are also necessary for the County to monitor costly replacements that may overlap for sewer, water, or reclaimed water, which could potentially create a funding shortfall.

2. Overall, infrastructure maintenance processes are efficient and effective; however, the processes related to the asset and maintenance information system, Maximo, need improvement. Internal controls are inadequate to ensure asset and maintenance data is accurate and complete.

   A lack of policies and procedures is contributing to inconsistencies when entering and updating asset and maintenance information in Maximo. During sample testing, we found several assets were lacking installation dates within Maximo. Some preventive maintenance work orders were canceled in the Maximo system without explanation and approval.

   Internal customer invoices generated from Maximo are not accurate. Based on sample testing, we found the variances in the rates billed stemmed from programming errors. The FY 2017 employee hourly rates and benefit factor were not programmed timely in Maximo; therefore, internal customers were not accurately billed for maintenance labor. The overall variance could be more substantial over several months and other errors could potentially exist. However, we could not conclude on the root cause of the variance.

Maintenance field processes need improvement to ensure data is reliable and to avoid unnecessary costs. Utility line markings at job sites are not photographed by the County. In the event that a utility line is damaged by a Contractor, disputes can arise as to who should be responsible for paying for damages.

A review of preventive maintenance for water and sewer air release valves indicated that valves have not been maintained timely. Lack of maintenance for some valves was due to instances other than untimeliness. For example, staff shut off some valves due to customers complaining of foul odor. Other valves could not be located for maintenance.

Hand written Maximo work orders are completed for CCTV inspections of utility pipes. Maximo is not installed on the mobile data terminals in the CCTV trucks, and therefore, the work order process is not efficient.

Staffing levels should be evaluated for sufficiency to ensure Utilities infrastructure can be maintained, repaired, and replaced effectively to meet future goals and objectives of the CIP. In addition, there are lone employees working night shifts at the W.E. Dunn Water Reclamation Facility, potentially creating safety issues and low morale from excessive overtime for employees covering those shifts.

3. The County is meeting the goals and objectives of the CIP. The County is in compliance with applicable laws and regulations. However, improvements are needed to ensure assets are maintained, repaired, and replaced based on an adequate Asset Management Program and operational Master Plans.

Our audit was conducted in accordance with the *International Standards for the Professional Practice of Internal Auditing* and the *Principles and Standards for Offices of Inspector General,* and accordingly, included such tests of records and other auditing procedures, as we considered necessary in the circumstances.

OPPORTUNITIES FOR IMPROVEMENT

Our audit disclosed certain policies, procedures, and practices that could be improved. Our audit was neither designed nor intended to be a detailed study of every relevant system, procedure, or transaction. Accordingly, the Opportunities for Improvement presented in this report may not be all-inclusive of areas where improvement may be needed.

1. The Utilities Asset Management Program Is Not Adequate.

The Utilities Asset Management Program has not been updated to reflect the replacement, disposal, and acquisition of new assets, resulting in inaccurate and incomplete data.

In a March 2004 Report to the Ranking Minority Member, Committee on Environment and Public Works, U.S. Senate, the United States Government Accountability Office (GAO) defined Asset Management as follows:

> *"At its most basic level, comprehensive asset management involves the systematic collection of key data and the application of analytical tools such as life-cycle cost analysis and risk assessment. Asset management thus provides information that managers can use to make sound decisions about their capital assets and allows decision makers to better identify and manage needed investments in their organization's infrastructure. By following this approach, organizations also change the process they use to make decisions, including the types of information they bring to bear and which segments of the organization participate in the decision-making process…*
>
> *Comprehensive asset management allows utility managers to obtain better information on the age and condition of existing assets, determine the level of maintenance needed to optimize asset performance and useful life, assess the risks associated with the failure of various assets and set priorities for their maintenance and replacement, understand the trade-offs and implications of management decisions about the assets, and use better information to justify proposed rate increases or capital investments."*

An Asset Management Program includes complete data on the age and condition of existing assets, determines the level of maintenance needed to optimize asset performance and useful life, assesses the risks associated with the failure of various assets, and sets priorities for their maintenance and replacement.

According to Management, there are two asset management applications, the Geographic Information System (GIS) and Maximo. The GIS contains all horizontal assets (i.e. pipelines) and some vertical assets (i.e. treatment facilities), depending on the type, while Maximo contains all assets, except water pipes.

In FY 2006, a consultant prepared a detailed spreadsheet as part of the overall Utilities Asset Management Program, which included a risk analysis for water, sewer, and reclaimed water assets. Assets were assigned a rating based on likelihood for failure and consequences of those failures. Although the risk analysis provided management a tool for asset replacement priorities, it has not been updated for more than ten years.

We attempted to verify asset information in GIS. Our review of projects indicated GIS was not consistently updated, and important information, such as installation date or material type, was not updated accordingly.

In 2016, Management implemented three process flows to help capture appropriate asset information. The process flows cover the three main project types: new projects, private entity projects, and field maintenance worker inspections. The various work flows identify the appropriate department or entity along with their corresponding job responsibilities to ensure asset information is properly and timely added to GIS and Maximo. However, Management stated it would likely be impossible to recapture 100% of data relating to the existing infrastructure.

The current process to manage Utilities infrastructure is not effective or efficient. Maximo, GIS, and the risk analysis spreadsheet do not include the data necessary to adequately project maintenance, repairs, and replacement needs, and future funding requirements.

In the March 2004 Report to the Ranking Minority Member, Committee on Environment and Public Works, U.S. Senate, the GAO stated:

> "*According to the Association of Metropolitan Sewerage Agencies and the International Infrastructure Management Manual, utilities generally need the following types of data to begin implementing asset management:*
>
> - *age, condition, and location of the assets;*
> - *asset size and/or capacity;*

- *valuation data (e.g., original and replacement cost);*
- *installation date and expected service life;*
- *maintenance and performance history; and*
- *construction materials and recommended maintenance practices."*

Assessing all assets may be time consuming, with the challenges of accessibility of underground water mains, service disruption, and high associated costs. However, acquiring the necessary data for the Asset Management Program will allow management to effectively and efficiently maintain utility assets.

In the March 2004 Report to the Ranking Minority Member, Committee on Environment and Public Works, U.S. Senate, the GAO stated:

> *"The difficulties utilities experience gathering data to implement asset management depend on the (1) condition of their existing data, (2) ability to coordinate existing data across departments, (3) need to upgrade technology, and (4) ability to sustain complete and accurate data. One industry official noted that larger utilities, in particular, may have a more difficult time gathering and coordinating data because they typically possess a substantial number of assets. Nevertheless, utility officials and water association representatives agree that utilities should not allow these data challenges to prevent them from implementing asset management. These officials emphasized that utilities should begin implementing asset management by using the data they already possess, continuing data collection as they perform their routine repair and maintenance activities, or focusing data collection efforts on their most critical assets."*

The County uses a "Pay-As-You-Go" approach to fund capital projects. The Introduction and Background sections of the County's FY 2018 - FY 2027 CIP state the following:

> "*During the FY 10 budget process, it was determined that due to the uncertainty in the bond and credit markets, over the next several years the CIP would attempt to be funded on a "Pay-As-You-Go" basis as much as possible. The "Pay-As-You-Go" approach is recommended as the most prudent way of financing capital projects."*

Once the condition of all assets have been fully assessed, the County may need to re-evaluate their funding approach. Funding sources, such as bond issuance, may be required to sustain an adequate level of service, and to pay for capital projects and emergency situations 20 or more years into the future.

In a March 2004 Report to the Ranking Minority Member, Committee on Environment and Public Works, U.S. Senate, the GAO stated:

> *"Comprehensive asset management also has the potential to improve a utility's bond rating, a benefit that translates into savings through lower interest rates on loans and bonds. When deciding on a utility's bond rating, credit rating agencies consider criteria related to comprehensive asset management, such as the utility's management strategies and its planning for asset replacement."*

Although management has developed a strategy for future asset management, an inventory of all assets, and an assessment of the condition of those assets, should remain a priority to reduce a potential gap between what is needed and what funds are available to meet failing infrastructure and/or emergency situations. The future Asset Management Program will be implemented in conjunction with a new asset management software system, Cityworks, which is expected to go live in two to three years.

Management stated the recession and County employee layoffs in 2009 impacted their ability to maintain the Asset Management Program. In addition, technology is not sufficient to provide all data necessary to develop an adequate Asset Management Program.

Without a proper assessment of all assets, unplanned failures create additional costs and can lead to reactive and unplanned replacements. Without a complete inventory of all assets and equipment, maintenance and/or replacements will potentially be overlooked causing disruptions in service and/or costly repairs. The lack of updated information also hinders the ability for future Utilities Management to accurately assess and plan for future needs.

An example of a costly, unplanned failure occurred on October 4, 2016, when a 30-inch sewer line broke in the Palm Harbor area. We toured the area of the break, located on Alderman Road and Omaha Street, on October 4, 2016 at approximately 10:30 am. Utilities and contractor crews

were already on-site responding to the issue. We observed that the sewer line break caused sewage to spill out in the retention pond, almost to the sidewalk by the Utilities pumping station. The smell emerging from the break was very toxic; in addition, there was heavily soiled greenery by the street.

Management stated the break was a result of several factors, which included the age of the pipe, air release valves (ARVs) not opened due to odor issues from years past (it was an administrative decision at that time), as well as the set-up of the pipes that created unnecessary gasses to build up, which eroded the pipes faster than expected.

An Asset Management Program can help Utilities meet the challenges of financing capital improvements, and renewing and replacing aging infrastructure. The Asset Management Program is the foundation for the development of Master Plans. See OFI No. 2 for further discussion.

We recommend Management:

A. Prioritize and continue the implementation of the Asset Management Program. The Asset Management Program should include:

   1. Comprehensive assessment of all assets.
   2. Data driven decisions to determine the criticality, risk, and consequences of all assets.

B. Evaluate staffing needs to support the Asset Management Program. Additional staff may be required to maintain and analyze data in the Asset Management Program.

Management Response:

A. **1. Management Concurs.** Management is currently in the process of shifting to an International Organization for Standardization (ISO) 55000 standards for asset management. As part of this transition, the Utilities Department will be planning and implementing workflows, processes, policies, standard operating procedures, and assessments that will be modeled on the ISO 55000 standards for asset management and will also align with the new work management system (Cityworks).

   2. Management Concurs. Management will be implementing the Probability x Consequence = Criticality model of asset management. This is consistent with the Countywide Enterprise Asset Management (EAM) strategies and initiatives.

B. **Management Concurs.** Management has identified several new positions that will be requested over the next few years as the Asset Management Program progresses. This request is currently under consideration.

2. There Are No Active Utility Master Plans.

A. There Are No Current Master Plans For The Water Reclamation Facilities.

Master Plans have not been implemented for existing and future maintenance, repairs, and replacement needs for the W.E. Dunn and South Cross Water Reclamation Facilities. Management stated a consultant is working on developing a Master Plan for the South Cross facility. The projected date of completion is FY 2019.

The W.E. Dunn Water Reclamation Facility Master Plan is outdated. The Master Plan was prepared by a consultant in August 2001, over 16 years ago. The Master Plan provided recommendations for improvements needed at the facility through 2021. The Master Plan has not been updated since 2001, and therefore, is not in accordance with best practices outlined by the Government Finance Officers Association (GFOA), which states:

> *"Master Plans, most frequently coordinated by the local government's planning department with broad community participation, identify jurisdictional needs ten to twenty-five years into the future. Regular updates to these plans are imperative to ascertain development or infrastructure needs as local conditions change."*

In addition to assessing the condition of assets, and future costs of maintaining, repairing, and replacing those assets, Management should consider the impact of customer demand projections, costs of those projections, and evaluation of rates for the future of water reuse systems.

The following are two examples that demonstrate the need for customer demand projections:

- On November 8, 2016, a Pinellas County Press Release stated that reclaimed water storage tanks at the South Cross facility were:

  "Critically low due to excessive user demand."

- On November 7, 2016, a Pinellas County Press Release stated on November 2, 2016, the reclaimed water at the W.E Dunn facility was shut down due to:

  "Critical low levels in the retention pond and excessive user demand during the overnight hours."

Both instances above indicate excessive usage by customers. Public education, meters, and potentially fines could be considered for the Reclaimed Water Master Plan. The Master Plan could also evaluate the option of larger capacity infrastructure to retain water at both facilities.

Management stated the current methodology for funding capital improvement projects includes planning for five to six years in the future; however, in order to determine future funding requirements, Management should evaluate the capacity and demand of reclaimed water for providing service for 20 or more years in the future.

The facilities must reliably and consistently produce and distribute recycled water of adequate quantity and quality. Therefore, reliability features in the design, construction, and operation of the facilities are essential.

Both water reclamation facilities are required to comply with Federal and State regulations. The Florida Department of Environmental Protection (FDEP) conducts routine inspections to determine if the facilities comply with regulations. Management stated the demands for environmental awareness and protection is becoming increasingly important, and therefore, additional regulations are continually being implemented. With the implementation of new regulations, it is imperative that the facilities have the resources to meet the requirements, which should also be incorporated into the Reclaimed Water Master Plan. These resources may include funding additional staff to meet the demands of new regulations.

During our review of customer calls for reclaimed water service, we noted several calls related to reclaimed water line leaks in the St. Pete Beach area and low pressure issues in the Tierra Verde area. These issues should be integrated as part of the overall Master Plan for reclaimed water. Although the labor charges are recouped for the St. Pete Beach service calls, the County is providing staff for the servicing (see OFI No. 3). This potentially eliminates staff time spent for Pinellas County infrastructure needs. Staffing levels and assignment of staff should be considered for future projects and growth in the Reclaimed Water Master Plan. In addition, the low pressure issues require future funding and planning.

Currently, in the CIP, there is a project number for each water reclamation facility with a lump sum of money budgeted. Management stated that historically, these project numbers, referred to as "Parent" projects, were used to allocate funds for smaller projects, typically $500,000 or less; this included emergency and job order contract projects. However, the current process entails that after projects have been identified for funding, they are assigned a separate project number for tracking expenditures. The funding for these projects is allocated from the "Parent" project or from previous projects that were overfunded (budget exceeded expenditures).

The table below represents the County's current CIP (FY 2018 through FY 2027) estimated fiscal impact of the "Parent" projects.

Fiscal Year	W.E. Dunn Facility	South Cross Facility
2017	$2,100,000	$2,000,000
2018	$600,000	$500,000
2019	$500,000	$500,000
2020	$800,000	$500,000
2021	$800,000	$2,000,000
2022	$800,000	$4,000,000
2023	$2,000,000	$4,000,000
2024	$2,000,000	$4,000,000
2025	$2,000,000	$4,000,000
2026	$2,000,000	$4,000,000
2027	$2,000,000	$4,000,000
Total	**$15,600,000**	**$29,500,000**

The table demonstrates that for several fiscal years, stagnate amounts have been allocated to the CIP. A Master Plan should define cost estimates based on an infrastructure condition assessment and working Asset Management Program rather than estimated allocations.

Identifying opportunities for recycled wastewater will also significantly impact future infrastructure funding for the water reclamation facilities. Evaluating other service areas and satellite systems will increase costs for maintenance, repairs, and replacements. Long term planning for maintenance, repairs, and replacements, in conjunction with a developed Asset Management Program, will allow management to become proactive in assessing future costs.

B. There Is No Master Plan For Sewer/Wastewater.

Utilities has several plans for sewer/wastewater, but none of them are currently documented or outlined in a formal Master Plan. In 2008, Utilities reviewed their operations of current pipe inspections via use of CCTVs, and created a plan to review/inspect all 990 miles of pipes and manholes within a 10 year period. However, aside from a verbal discussion with Utilities Management, this project is not formally documented in an official Master Plan or project listing to include measurable goals.

In 2013, Utilities conducted a risk analysis of its ARVs for 16-inch and greater pipes. The analysis assisted Utilities to focus on high risk ARVs, and start a plan to replace valves beyond their useful life, and upgrade smaller valves to stainless steel valves/saddles. Aside from spreadsheets maintained by managers, this project is not formally documented in an official Master Plan or project listing with measurable goals.

Utilities Management stated a Sewer/Wastewater Master Plan existed several years ago and included major projects that have since been completed; however, this document has not been updated on a routine basis, and due to inadequate technology, a proactive Asset Management Program has not yet been implemented to align with a proper strategic plan.

C. The Master Plan For The Water Utility Is Not Current.

A Master Plan was developed in November 2010 for the water utility; however, the Master Plan has not been updated to reflect changes that may require future repairs and replacements.

As with reclaimed water, the County's water utility must reliably and consistently produce and distribute water of adequate quantity and quality. Therefore, reliability features in the design, construction, and operation of water infrastructure is essential. Water resources are required to comply with Federal and State regulations. The FDEP conducts routine inspections to determine if the County complies with regulations. Management stated the demands for environmental awareness and protection are becoming increasingly important, and therefore, additional regulations are continually being implemented. With the implementation of new regulations, it is imperative that the County have the resources to meet the requirements, which should also be incorporated into the Water Master Plan. These resources may include funding additional staff to meet the demands of new regulations.

A presentation by Utilities Management stated estimated funding costs for water system capital improvement projects amounts to $114 million over a 10-year period. Once the condition of assets has been fully assessed, the County may need to re-evaluate their funding approach. The current estimated funding costs for water system capital improvement projects may not be adequate. Failing infrastructure creates emergency type situations, which can be costly.

The 2017 Report Card for America's Infrastructure, published by the American Society of Civil Engineers, gave an overall grade of a “D” to the nation's funding of drinking water infrastructure, stating that:

> *"Drinking water is delivered via one million miles of pipes across the country. Many of those pipes were laid in the early to mid-20th century with a lifespan of 75 to 100 years. The quality of drinking water in the United States remains high, but legacy and emerging contaminants continue to require close attention. While water consumption is down, there are still an estimated 240,000 water main breaks per year in the United States, wasting over two trillion gallons of treated drinking water. According to the American Water Works Association, an estimated $1 trillion is necessary to maintain and expand service to meet demands over the next 25 years.*

> *Because America's drinking water infrastructure provides a critical service, significant new investment and increased efficiencies are needed as filtration plants, pipes, and pumps age past their useful life. Every day, nearly six billion gallons of treated drinking water are lost due to leaking pipes, with an estimated 240,000 water main breaks occurring each year. It is estimated that leaky, aging pipes are wasting 14% to 18% of each day's treated water; the amount of clean drinking water lost every day could support 15 million households.*
>
> *While drinking water infrastructure is funded primarily through a rate-based system, the investment has been inadequate for decades and will continue to be underfunded without significant changes as the revenue generated will fall short as needs grow. According to the American Water Works Association, upgrading existing water systems and to meeting the drinking water infrastructure needs of a growing population will require at least $1 trillion."*

Management stated there is no current formal assessment on the condition of all asset classes, no replacement cycle estimates, and no future planned maintenance costs based on the assessment. The status of these components are crucial in a Master Plan for long-term planning and funding. Management stated that an assessment will be conducted during the implementation of the Enterprise Asset Management system, Cityworks, projected to be completed within two to three years.

The Utilities Engineering Division is currently in the process of formalizing an Asset Management Program that will utilize consistent guiding principles. Projected life cycles of assets, proper maintenance of assets, and risk assessments provide for optimal future funding requirements on a continuous basis.

The Utilities Division's current approach for forecasting future funding of capital projects is determined by:

- Emergency situations
- Annual maintenance programs
- Planned projects

Management stated that replacement needs are also determined by problems discovered during routine maintenance work.

As previously discussed, the County uses a "Pay-As-You-Go" approach to fund capital projects. Funding sources, such as bond issuance, may be required to sustain an adequate level of service and to pay for capital projects and emergency situations 20 or more years into the future.

Proper funding cannot be adequately projected without proper long-term planning for maintenance, repairs, and replacement needs of aging infrastructure. Unplanned failures usually

incur additional costs and can lead to reactive and unplanned replacements, such as sewer line and water main breaks.

The GFOA provides best practices for Master Plans and capital improvement planning. The GFOA defines the background of Master Plans and capital improvement planning as follows:

> *"Many governments establish long-range strategies focused on community development and sustainability through the use of Master Plans. As blueprints for the future, these plans identify economic, land use, and infrastructure development and/or redevelopment, which may include transportation, housing, and public facilities. Master Plans, most frequently coordinated by the local government's planning department with broad community participation, identify jurisdictional needs ten to twenty-five years into the future. Regular updates to these plans are imperative to ascertain development or infrastructure needs as local conditions change.*
>
> *Master Plans are the foundation for:*
>
> - *the development of physical plans for sub-areas of the jurisdiction;*
> - *the study of subdivision regulations, zoning standards and maps;*
> - *the location and design of thoroughfares and other major transportation facilities;*
> - *the identification of areas in need of utility development or extensions;*
> - *the acquisition and development of community facility sites;*
> - *the acquisition and protection of open space;*
> - *the identification of economic development areas;*
> - *the incorporation of environmental conservation;*
> - *the evaluation of short-range plans (zoning requests, subdivision review, site plan analysis) and day-today* [sic] *decisions with regard to long-range jurisdictional benefit; and*
> - *the alignment of local jurisdictional plans with regional plans.*
>
> *In addition to a long-range Master Plan, governments utilize Capital Improvement Plans (CIP) to identify present and future needs requiring capital infrastructure. Such plans operate for a shorter duration, often three-to-five years, and list the projects and capital programs planned for the community with corresponding revenues and financing sources. Paying attention to financial factors during the development of master plans allows for a smoother transition of long-range plans to implementation and lessens the impact on the CIP and future operating budgets. Subsequently, to adequately guide the fiscal, operating, and land use needs of the community, finance officers should use Master Plans as a framework for capital project requests that go into the CIP."*

The GFOA recognizes the role of Master Plans as one of the CIP's important elements and recommends that governments consider the following:

> *"1. Master Plans should provide a vision for capital project plans and investments. Master Plans provide a vision for the government that should be supported by realistic planning documents, solid financial policies targeted for the implementation of stated goals, and trends on the government's accomplishments and progress toward these goals. Such plans forecast the outlook for the government, illustrating the alignment between demand generators, CIP and funding policies. In doing so, Master Plans help address the management factors that are critical in rating analysis and investor communication.*
>
> *2. Governments should make capital project investment decisions that are aligned to their long-range Master Plans. The list of potential projects for inclusion in the CIP comes from a variety of sources, including department requests, plans for facility construction and renovations, long-term capital replacement programs, citizen requests, neighborhood plans and projects for which grant funds are available. These projects should always be reviewed for consistency with the government's Master Plan(s). The CIP should be viewed as a financial blueprint that helps prioritize needs to achieve implementation of the public improvements identified in the Master Plan. The level of funding in the CIP defines the financial capacity to reach the desired goals set forth in the Master Plan.*
>
> *3. The finance officer should play an active role in the early planning process. Master Plans can be useful for projecting long-range service demand generators, facility capacity needs, and stakeholder communication. Knowledge of facility capacity needs coupled with financial policies and revenue comparisons allows for the development of a more fiscally prudent Master Plan. It is important that Master Plans strike a balance between stakeholder vision and the government's financial capacity in order to reach the desired goals. This balance can be accomplished by considering financial implications during the development phase of a Master Plan.*
>
> *4. Financial factors should be considered as part of the development of Master Plans. The master planning process should be an in-depth analysis, incorporating the financial factors that bridge the gap between planners and finance officials. When integrating plans with financial policies, governments should consider both the costs and revenue streams. Possible revenue streams include bond programs, pay as you go alternatives, grants, impact fees, and public private partnership alternatives. Reviewing the revenue generating potential under the plan assumptions will help identify the capability to finance needed capital projects as well as any gaps in the ability to do so. Moreover, the plan's vision should be balanced between the financial capacities to meet the stated goals, or at a minimum, should clearly identify the financial implications of a vision that may conflict with the jurisdiction's financial policies and capacity. Planning documents should incorporate scenario testing during development and the jurisdiction*

should, at a minimum, understand the plan cost drivers, alternative scenario outcomes (from both a need and revenue generating potential) and options for meeting the desired goals."

We recommend Management:

A. Continue to develop and implement a Master Plan for the South Cross Water Reclamation Facility. The completed Master Plan should be reviewed and updated periodically as recommended by best practices.

B. Update the W.E. Dunn Water Reclamation Facility Master Plan to align with current and future funding requirements. The Master Plan should be reviewed and updated periodically as recommended by best practices.

C. Evaluate recommendations provided in the 2001 Master Plan for the W.E. Dunn facility to determine if there are issues outstanding that require future planning and funding.

D. Develop a Master Plan for collection and transmission infrastructure for sewer/wastewater. The completed Master Plan should be reviewed and updated periodically as recommended by best practices.

E. Update the Master Plan for the water utility to align with current and future funding requirements. The Master Plan should be reviewed and updated periodically as recommended by best practices.

Management Response:

A. **Management Concurs.** Management has requested funding in FY 19 for the South Cross Bayou Master Plan to be performed.

B. **Management Concurs.** Management has requested funding in FY 19 for the W.E. Dunn Master Plan to be performed.

C. **Management Concurs.** As part of the proposed W.E. Dunn Master Plan scheduled in FY 19, we will address current issues and review recommendations from previous reports.

D. **Management Concurs.** Management will be requesting funding for the North and South County Wastewater Master Plans in FY 20 - FY 22. Currently, hydraulic models are being created for both the North and South wastewater system in preparation for the Master Plan effort. In addition, a major Infiltration and Inflow (I&I) Study is being performed on the South County Wastewater Collection System to determine where there are system defects causing excessive flows during wet weather events. Several capital projects have been identified and additional capital projects will be identified as the field investigation for this program continues over the next few years.

E. **Management Concurs.** Management has requested funding in FY 19 for the Water System Master Plan to be performed.

3. Internal Customer Invoices Are Inaccurate.

Invoices sent to St. Pete Beach for services provided by Utilities are not accurate. The Utilities Maintenance Division provides labor and materials for servicing St. Pete Beach owned reclaimed pipes. St. Pete Beach is considered an internal customer of Utilities. Each month, Maximo generates invoices for these services. Business Technology Services (BTS) is responsible for programming the employees' labor rate, benefit factor, and any rate adjustments in Maximo.

The labor rate billed includes the employees' hourly rate plus a benefit factor, which changes on October 1st of each fiscal year. The benefit factor includes the cost of the Federal Insurance Contributions Act (FICA), retirement, group life insurance, long term disability, and group health and dental insurance.

We reviewed a sample of monthly invoices sent to St. Pete Beach to determine if the labor rates billed were accurate. The sample included five randomly selected line items (labor billed) from the February 2017, August 2016, and June 2015 monthly invoices.

Our review indicated the August 2016 and June 2015 invoices were accurate with the exception of a few dollars and cents. However, the February 2017 invoice was inaccurate, with a total variance of $22.13 based on the limited sample. Management stated the inaccurate February 2017 invoice must have been related to data output issues in Maximo.

Subsequent to our initial sample testing, we obtained the September 2016 and October 2016 invoices to determine if the incorrect rates on the February 2017 invoice took effect at the transition to the new fiscal year, beginning October 1, 2016.

We found the September 2016 invoice had a net variance of $16.36. This amount was primarily the result of one employee that was billed at $15.14 less than our calculation and one temporary employee that was billed $1.26 less than our calculation. The October 2016 invoice had a variance of $12.47. Our calculation was higher than the amount billed.

The following table summarizes the variances by the monthly invoices in our sample. The "Sample" column numbers, 1 through 5, represent the labor charges/line items selected for the sample. The "Total" row represents the net variance by month. Amounts noted in parenthesis represent the variances in labor charges that were billed higher than our calculation.

Sample	June 2015	August 2016	September 2016	October 2016	February 2017
1	($.01)	($0.01)	$15.14	$1.83	$9.54
2	$.03	$0.05	($.01)	$4.95	$5.18
3	$.09	$0.00	($.02)	$4.15	$2.37
4	($.01)	$0.00	($.01)	$1.22	$3.18
5	$.01	$2.72	$1.26	$0.32	$1.86
Total	**$.11**	**$2.76**	**$16.36**	**$12.47**	**$22.13**

Although the variances noted above are nominal, the total variance for each invoice could be substantially more. For example, the invoice for September 2016 was 94 pages. There are several separate labor charges on each page of the invoice. The random sample for the September 2016 invoice consisted of only five separate labor charges. These five labor charges combined would only be approximately one of 94 pages (1%) of the invoice. Therefore, the variance could be much higher for the total invoice.

To determine the root cause of the variances, we requested the Maximo rate tables used by BTS. BTS provided spreadsheets with Utilities employees' labor rates that were created by the database administrator for the periods of November 23, 2015, December 17, 2015, and May 5, 2017. As a result of the information obtained, we were able to determine that the benefit factor for FY 2017, 50.05%, was not updated on October 1, 2016, the start of the new fiscal year. The benefit rate in Maximo per the May 5, 2017 spreadsheet was 49.26%, the rate from the prior fiscal year. This caused at least some of the variance in our October 2016 and February 2017 sample.

There was also a variance in an employee's labor rate in the September 2016 and February 2017 sample when compared to the November 12, 2015 and May 5, 2017 spreadsheets received from BTS. The employee's hourly rate was lower in the BTS spreadsheets than what was confirmed by the County's Finance Division for the September 2016 and February 2017 sample. The difference in the employee's hourly rate caused some of the variance in our September 2016 and February 2017 sample.

The root cause of the variances is unknown. However, Management has not implemented adequate controls to detect invoice errors. Without adequate controls, Utilities may be over or under charging for labor. If errors are undetected, the variance could be substantial over several months. Inaccurate invoices subject the County to potential liability if rates are overcharged; conversely, undercharging for labor results is less revenue for Utilities.

Potentially, other inaccurate invoices were issued to internal customers. In addition to St. Pete Beach, Utilities maintenance staff also provides billable services to the Pinellas County Parks and Conservation Resources Department and State of Florida Department of Health. Management stated Maximo has not been working correctly. Controls, such as policies and procedures, are necessary to ensure labor rates and invoices are calculated accurately. The

policies and procedures should include processes for both the Utilities Maintenance Division and BTS.

Sufficient internal controls ensure invoices are processed accurately and timely. This includes controls designed to safeguard assets, ensure the timeliness, accuracy, and reliability of financial and management reporting, and to promote operational efficiency, effectiveness, and compliance with all applicable laws, regulations, policies, and procedures.

We recommend Management:

A. Work with BTS to determine the root cause of the labor charge variances in the St. Pete Beach invoices.

B. Implement written policies and procedures for the internal customer billing processes, including BTS notification and verification of labor rate changes, and controls to detect invoicing errors.

C. Collaborate with BTS and OMB to verify Maximo programming when rate changes, such as the following, take effect:

- Fiscal year benefit rate adjustments
- Employee pay general increases
- Employee merit raises
- Employee promotion rate adjustments
- Employee demotion rate adjustments
- Temporary employee adjustments
- Overtime rates

D. Verify St. Pete Beach invoices and other internal customer invoices until the root cause of the variance is determined and remedied.

E. Consider billing St. Pete Beach at a flat rate to minimize the potential for invoice errors.

Management Response:

A. **Management Concurs.** There are multiple departments involved with the internal customer invoice process. The internal customer invoice process will be reviewed and analyzed in order to fully understand the process and to ensure any gaps are corrected.

B. **Management Concurs.** There are multiple departments involved with the internal customer invoice process. The internal customer invoice process will be reviewed and analyzed in order to fully understand the process and to ensure any gaps are corrected.

C. **Management Concurs.** There are multiple departments involved with the internal customer invoice process. The internal customer invoice process will be reviewed and analyzed in order to fully understand the process and to ensure any gaps are corrected.

D. **Management Concurs.** There are multiple departments involved with the internal customer invoice's process. The internal customer invoice's process will be reviewed and analyzed in order to fully understand the process and to ensure any gaps are corrected.

E. **Management Concurs.** As part of ensuring an efficient process and to minimize errors, a flat rate for billing St. Pete Beach will be explored.

4. There Are No Written Policies And Procedures For The Water Reclamation Facilities' Maintenance Processes In Maximo.

Management at the W.E. Dunn and South Cross Water Reclamation Facilities have flow charts, which document the processes used for preventive maintenance and quality control. The flow charts provide a visual guide to the steps in the process; however, there are no specific written instructions for each step.

The Maximo work order and asset management system provides information for water, sewer, and reclaimed assets, and tracks maintenance history. There are generic Maximo software user manuals on how to enter information. However, the manuals do not provide guidance specific to activities related to the water reclamation facilities.

As of December 12, 2016, the W.E. Dunn Water Reclamation Facility had 6,662 equipment items, and, as of the same date, 1,887 preventive maintenance (PM) numbers in Maximo.

As of December 16, 2016, the South Cross Water Reclamation Facility had 9,894 equipment items, and as of the same date, 2,129 PM numbers in Maximo.

We randomly tested a sample of 75 PMs in Maximo for the W.E. Dunn Water Reclamation Facility and 75 PMs for the South Cross Water Reclamation Facility.

During our testing, we noted that there were inconsistencies when inputting information into Maximo. In the Maximo equipment module, some equipment had the installation date input, while other equipment did not.

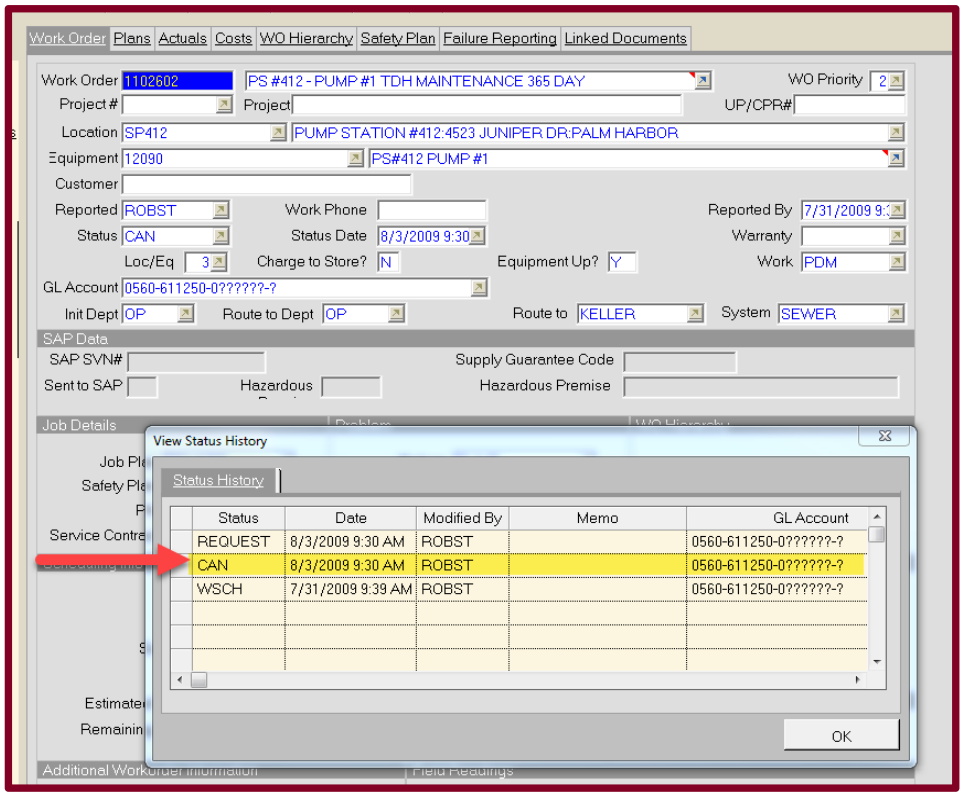
Below is a recap of our testing results where the equipment installation date was missing:

- W.E. Dunn facility, 25 of 75 tested, or 33% of the sample
- South Cross facility, 23 of 75 tested, or 31% of the sample

Although a PM schedule was implemented, it could not be determined if the equipment was installed prior to the PM start date. Using only the start date on the PM screen does not provide assurance that the equipment has been maintained since it was installed.

Other discrepancies were noted during the testing of the W.E. Dunn and South Cross samples.

During testing of the W.E Dunn facility, we noted 4% of the sample, or 3 of 75 PMs, had canceled work orders without explanation or management approval. Management explained that these were PM work orders "turned off" for the Keller Pump Station. Management at the Keller Pump Station turned off the PM work orders because they did not have enough staff to maintain them. The W.E. Dunn facility took over the Keller Pump Station approximately two years ago and created new PM numbers to restart the maintenance process. The "turned off" work orders stated they were canceled in the system (see the following screen shot for an example); however, there was no explanation or management approval noted.



For the South Cross facility, 3% of the sample, or 2 of 75 PMs, displayed “no record found” when entered into Maximo. Management stated this is most likely due to a system error. In addition, 4% of the South Cross sample, or 3 of 75 PMs had canceled work orders without explanation or Management approval.

There was one instance when a South Cross PM work order was not initiated due to an invalid general ledger account number. Management stated there have been other PM work orders in the system that were missed due to invalid general ledger account numbers. Management stated general ledger accounts were updated in 2011 in Maximo, during the County’s conversion to OPUS (Oracle Project Unified System). Management speculates that some equipment items and PM work orders were missed when the general ledger accounts were updated in Maximo.

In another instance, South Cross equipment did not show maintenance history in Maximo. Management stated the equipment maintenance is now performed under a master work order. However, the equipment listed under the master work order is not the same type of equipment. The master work order did not reference the equipment number in Maximo, and the equipment module in Maximo did not reference the master work order number. There is no trail in Maximo to ensure the equipment is being maintained per the established frequency.

Management has not developed and implemented written policies and procedures for Maximo quality assurance to ensure that the quality control process is working efficiently and effectively. The issues noted above are examples of why written policies and procedures are necessary to provide consistency in the PM processes used. The discrepancies noted above would be prevented and/or detected through quality assurance that would require periodic audits of system generated PMs.

Lack of written policies and procedures contributes to inconsistences in work processes. In addition, without written policies and procedures, there is the potential for PMs to be excluded during the equipment maintenance cycle.

Written procedures provide guidance that is necessary to properly and consistently carry out departmental activities at a required level of quality. The establishment of the procedures provides the opportunity for management to ensure that adequate processes and internal controls have been established. The development of procedures also support the cross-training and backup for key staff functions. It is management's responsibility to establish written internal procedures covering key department processes. The procedures should be in sufficient detail to provide standard performance criteria and reduce the risk of misunderstanding and/or unauthorized deviations that could cause processing errors.

Quality control activities are designed and performed to monitor operations and maintenance to ensure they are adequate and appropriate. Quality assurance is focused on providing

confidence that quality requirements are fulfilled, which include policies and procedures, and the systems are working efficiently and effectively.

We recommend Management develop and implement formal written policies and procedures for the water reclamation facilities' maintenance documentation in Maximo. The written policies and procedures should include the following requirements:

- Installation date for equipment.
- Explanations and approvals for canceled work orders.
- Periodic quality assurance audit to ensure the information in Maximo is accurate and processes are efficient and effective.

Management Response:

Management Concurs. Management is currently in the process of shifting to an ISO 55000 standards for asset management. As part of this transition, the Utilities Department will be planning and implementing workflows, processes, policies, standard operating procedures, and assessments that will be modeled on the ISO 55000 standards for asset management, and will also align with the new work management system (Cityworks).

5. The W.E. Dunn Water Reclamation Facility Does Not Have Adequate Staffing For All Shifts.

The W.E. Dunn Water Reclamation Facility does not have adequate staffing for weekend or overnight shifts. The facility operates 24 hours a day, and therefore, employees are required to work nights. As of December 29, 2016, the W.E. Dunn facility had 27 employees; however, there is only one employee working on the following shifts:

- 12 hour shift during weekend days
- 12 hour shift during weekend nights
- Second shift 4:30 pm - 9:00 pm weekdays
- Third shift 9:00 pm - 7:00 am weekdays

When a second or third shift employee calls in and cannot report to work, daytime staff are required to work the shift. In FY 2016, overtime pay amounted to $134,148.86 for the W.E. Dunn facility. Overtime is caused by circumstances such as emergencies, covering for staff out due to medical leave, and covering for the lone shifts as stated above.

The Pinellas County Water/Wastewater Operator I position's pay grade is CL12, and has an hourly pay range of $16.84 to $26.25. We calculated the full hourly rate, using the benefit factor obtained from the Clerk's Finance Division. The full hourly rate amounted to $19.81 (using the minimum starting rate of pay of $16.84), which includes the employer's share of taxes, benefits, and retirement. The full hourly rate of $19.81 for 2,080 hours (number of work hours annually) equals $41,204.80, the full annual cost.

The amount of overtime paid in FY 2016, $134,148.86, could have potentially funded three full-time Water/Wastewater Operator I positions ($134,148.86/$41,204.80) to assist with coverage for any of the circumstances noted. The tasks of the Water/Wastewater Operator I position include a variety of necessary responsibilities to ensure the facility is safe, efficient, and in compliance with the requirements of the FDEP.

Safety, not only for employees, but also for the facility itself, is a factor that needs to be considered when assigning staffing levels. For example, Management stated an employee died approximately 15-20 years ago while working alone overnight at the W.E. Dunn facility. The employee was found the next morning by staff.

Management stated the budget has not been funded to include hiring additional staff. However, employees working alone with multiple responsibilities increase safety issues for the employee and the facility. In addition, morale and efficiency are compromised when employees are required to work multiple shifts.

Adequate staffing could reduce work-related injuries, improve employee morale, and increase the level of customer satisfaction.

We recommend Management hire additional staff for shifts with lone employees.

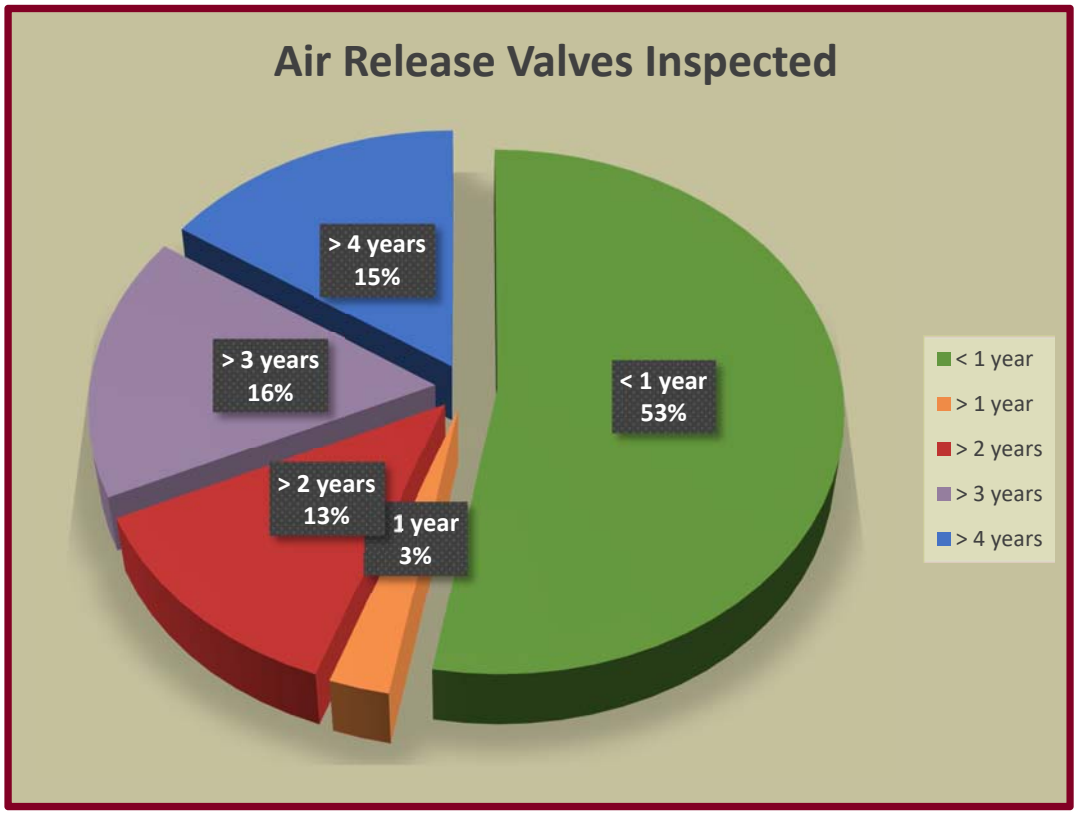
Management Response:

Management Concurs. Management has identified three new Operator Trainee positions that are being requested in a FY 19 budget decision package request. The request is currently under consideration.

6. Sewer Air Release Valves Are Not Being Maintained Timely.

Our review of all Maximo sewer ARV PM work orders completed between September 2012 and January 2017 found only 53% of the sewer ARV PM work orders had been completed in the last year, while 15% have not been completed in over four years. Utilities set forth in their PM work orders that sewer ARVs should be inspected and cleaned on an annual basis.

The following chart depicts the percentages of sewer ARV work orders inspected, as discussed below.



ARVs are hydromechanical devices designed to automatically release air and wastewater gases or admit air during the filling, draining, or operating of liquid piping systems for water and wastewater services. As air and gas pockets form in the sewer pipes, it is important to have functioning valves to release these gases to help prevent corrosion, burst pipes, as well as reduced sewer flow.

Per PM best practices set forth by Pinellas County Utilities, as well as best practices and maintenance programs from similar counties across the country, sewer ARVs should be inspected and cleaned on an annual basis to ensure valves operate as intended, as well as to extend the life of the valves themselves and the sewer pipes they service.

Due to a lack of dedicated employees to maintain the sewer ARVs, many PM work orders have gone uncompleted for several years. The lack of maintaining or inspecting sewer ARVs on a regular basis could result in a shorter life for the valves, as well as shortening the life of the sewer pipes and pumps due to failing valves not allowing corrosive gases to be released from the pipes.

Additionally, in certain parts of the County, at the request of citizens and the discretion of Management, ARVs were closed to eliminate the foul odor from the gases they are intended to release. On October 4, 2016, a 30-inch sewer force main in Palm Harbor broke, spilling an unknown amount of raw sewage into a nearby retention pond at approximately 1,000 gallons per minute. Initial review by Utilities Engineering and Management suspected the pipe failed due to its age of almost 40 years old; however, further investigation determined the ARVs on that pipe segment were closed years earlier after several complaints from nearby citizens regarding the odor. Closing the air valves trapped corrosive gases, causing the pipe to deteriorate at a faster rate than expected.

The picture below demonstrates the level of deterioration of the sewer force main, which caused the Palm Harbor sewage spill.

As a result of this spill, Management stated they will be changing their method of operations regarding ARVs, including not closing them despite the smell and complaints from citizens.

Starting in 2017, Utilities reviewed and reorganized their PM operations and now have a team solely dedicated for sewer ARV maintenance.

We recommend Management:

A. Maintain a dedicated crew to inspect and clean sewer ARVs on a timely basis set forth by the PM program to maximize the life of the ARVs and the sewer pipes they service.

B. Implement a review process to verify each PM work order for all ARVs are completed at least annually.

Management Response:

A. **Management Concurs.** Management established an ARV crew in the fall of 2016. This ARV crew works with the Engineering Division in Utilities to develop a full evaluation and risk matrix. There were 843 water, sewer, and reclaim ARVs prioritized and serviced. There were 23 ARVs identified as needing an engineered solution for replacement. Solutions have been identified and scheduled for implementation.

B. **Management Concurs.** Monthly and annual performance measures are in place to review all ARV PMs.

7. Water Air Release Valves Have Not Been Maintained Timely.

Water ARVs have not been maintained annually in accordance with best practices. As of October 16, 2017, the Utilities Maintenance Division had 240 water ARVs. ARVs are designed to protect the pipeline system and maintain its efficiency by automatically releasing small pockets of accumulated air while the pipeline operates under pressure. When air becomes trapped, it can cause pump failures, corrosion, flow issues, and water hammer or pressure surges. Unnecessary air in the pipeline also makes the pump work harder, resulting in additional energy consumption.

We performed a sample test of 50 water ARVs to determine if maintenance was performed annually. Our test results indicated that 100% of the sample had not been maintained annually. In addition, 47 of the 50 (94%) water ARVs did not have installation dates (see OFI No. 9 for further discussion). Fourteen of the 50 (28%) water ARVs indicated the ARVs were turned off or unable to be located.

We noted the majority of water ARVs had maintenance work orders in the years 2010, 2011, and 2017. However, there is no indication in Maximo that maintenance was performed prior to 2010, with the exception of four water ARVs. For the majority of the ARVs, there is a five year gap (2012 - 2016) when maintenance work orders were not in Maximo.

Subsequent to our initial testing, on December 29, 2017, Management provided a spreadsheet with maintenance history for water ARVs. Management stated work orders were maintained on the spreadsheet rather than in Maximo for the time period gaps mentioned above. However, our review of the spreadsheet indicated that gaps remain where maintenance was not performed.

Management stated that a dedicated upgrade program and crew have been implemented. In 2017, all but 22 water ARVs have a preventive or corrective maintenance plan. Management also stated that beginning in October 2017, the maintenance crew has started the second round of PM for 2018. Management is working with the Engineering Division for solutions for the 22 outstanding water ARVs.

The Utilities Maintenance Division staff prepare monthly performance indicators for achieving annual maintenance goals. The ARVs should be included in the performance indicators as a means to monitor maintenance performance.

Management stated the measures they began approximately eight to ten years ago demonstrated the original PM plan was not working. Over the years, many ARVs were shut off due to odors, and others were not serviced due to the possibility of a control valve sticking in the closed position.

Best practices and the Utilities Maintenance Division's policy requires that ARVs be maintained at least annually and more often for valves that operate continuously. ARVs should also be monitored for external leakage.

We recommend Management:

A. Monitor the maintenance on all water ARVs to ensure timeliness of performance.

B. Add the water ARVs to the monthly performance indicators.

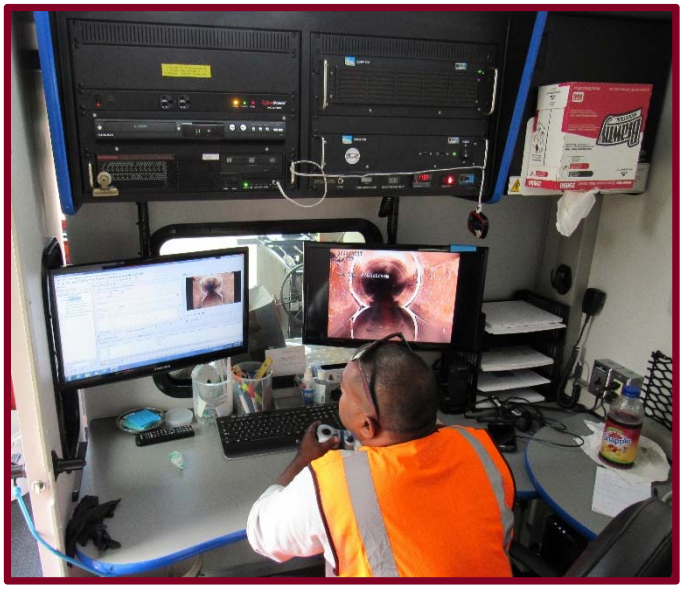
Management Response:

A. **Management Concurs.** Monthly and annual performance measures are in place to review all ARV PM.

B. **Management Concurs.** Monthly and annual performance measures are in place to review all ARV PM.

8. Hand Written Maximo Work Orders Are Being Produced From CCTV Inspections.

Maximo is not installed on the computers in the CCTV inspection trucks, requiring crews to hand write work orders for Maximo that correspond with work orders completed in Granite. Granite is a widely used application that provides a comprehensive toolset for Utilities' crews to visually inspect pipes through CCTV devices and identify segments in need of repair, renewal, or replacement. The hand written work orders are provided to a data entry team that is responsible for creating and updating the work orders in Maximo.



At least 30 minutes a day is being wasted by having the crews on the CCTV trucks hand write Maximo work orders instead of directly updating the work orders in Maximo.

Maximo may not be updated timely as work orders may take up to a week or more for the data entry team to complete the backlog of paper work orders. Per discussion with Management, the data team may spend at least five minutes per work order updating Maximo.

Over the past five years, over 12,000 CCTV work orders have been completed, equating to a possible 1,000 hours (12,000 @ 5 minutes) being wasted by requiring additional people to update work orders. The possibility exists for errors in Maximo entries due to inability to read hand writing or paper work orders being misplaced.

In order to improve efficiency of the Utilities CCTV crew, enabling the ability to maintain and update work orders electronically, both on site and while completing them in real time, should be utilized over conventional manual methods, such as pre-printed forms.

The elimination of pre-printed forms and the manual process associated with them would reduce the time needed for the system to be updated, and the resources needed to do so.

We recommend Management:

A. Install Maximo software on the CCTV work trucks.

B. Cross-train the CCTV crews to update Maximo orders as they are completed in real time to reduce wasted time and errors.

C. Evaluate options for Granite to interface with Cityworks to eliminate double entry of data.

Management Response:

A. **Management Concurs.** Management has installed Maximo in all CCTV trucks.

B. **Management Concurs.** Training was scheduled for late April 2018.

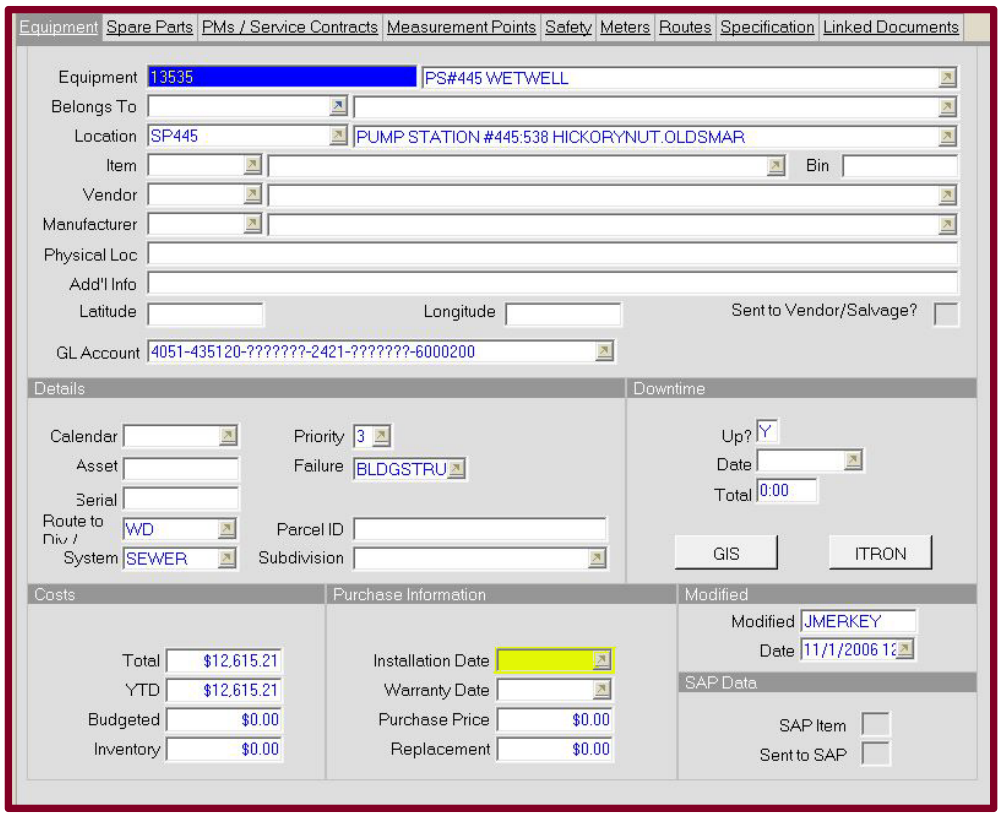
C. **Management Concurs.** As part of the interface, all options are being discussed and evaluated to enhance and minimize errors in the system.

9. Equipment Installation Dates Are Missing In The Maximo Maintenance System.

Equipment installation dates have not been consistently entered into Maximo. We performed testing on a sample of meters, hydrants, backflows, and water ARVs to determine if maintenance was performed in accordance with the frequencies established in Maximo. During testing, we noted there were installation dates missing for several equipment items. We reviewed the maintenance work history for the equipment listed in the sample. However, for the equipment that did not have an installation date, we could not determine if maintenance had been performed since it was placed in service.

Below is a summary of the sample testing results where the equipment installation date was missing:

- Meters, 1 of 50 tested, or 2% of the sample
- Hydrants, 19 of 75 tested, or 25% of the sample
- Backflows, 9 of 75 tested, or 12% of the sample
- Water ARVs, 47 of 50 tested, or 94% of the sample



Management stated that assets installed prior to 1999, during the implementation of Maximo, would most likely not have an installation date and/or the assets were too old and the data was not available. However, we found several instances during our sample testing where equipment had installation dates prior to 1999. These instances are summarized below:

- Meters, 6 of 50 tested, or 12% of the sample
- Hydrants, 48 of 75 tested, or 64% of the sample
- Backflows, 7 of 75 tested, or 9% of the sample
- Water ARVs, 1 of 50 tested, or 2% of the sample

Based on the testing results of our sample, there is inconsistency with the input of installation dates in Maximo.

The Utilities Maintenance Division has written policies and procedures, including visual screens, to guide staff on entering equipment into Maximo. However, the policies and procedures do not require an installation date to be entered.

The GAO, in a March 2004 Report to the Ranking Minority Member, Committee on Environment and Public Works, U.S. Senate, stated the following:

> "*According to the Association of Metropolitan Sewerage Agencies and the International Infrastructure Management Manual: Utilities generally need the following types of data to begin implementing asset management:*
>
> - *age, condition, and location of the assets;*
> - *asset size and/or capacity;*
> - *valuation data (e.g., original and replacement cost);*
> - *installation date and expected service life;*
> - *maintenance and performance history; and*
> - *construction materials and recommended maintenance practices."*

Without the installation date, there is no starting point to determine if PM has been performed based on the frequency requirements. It may also be difficult to determine the age of the equipment for replacement needs.

We recommend Management:

A. Update written policies and procedures to require an installation date be entered into Maximo for all assets/equipment. The policies and procedures should include instructions for staff on how to enter the installation date in Maximo.

B. Ensure Cityworks is programmed with a field edit check that requires the input of a valid installation date for every asset.

Management Response:

A. **Management Concurs.** Management is currently in the process of shifting to an ISO 55000 standards for asset management. As part of this transition, the Utilities Department will be planning and implementing workflows, processes, policies, standard operating procedures, and assessments that will be modeled on the ISO 55000 standards for asset management and will also align with the new work management system (Cityworks).

B. **Management Concurs.** Cityworks has been configured so that as each new asset is installed, there is a required data field within the Cityworks work order that identifies the date the installation is completed. A global workflow has been developed that requires that newly installed assets be imported into the GIS, where the asset and asset attribute inventory resides. Installation dates are a global field within the GIS data schema and the Enterprise GIS (EGIS) Team is sent an "Update GIS" work order template, once a new asset is installed, providing all of the asset and asset attribute data information. There is a Quality Assurance/Quality Control (QA/QC) check of the Cityworks work order entries by the supervisor, overseeing the new asset installation, as well as by senior leadership upon closing out of the work order. This sequential and layered approach to the QA/QC process ensures that global workflows are followed and the appropriate information is captured to provide an accurate asset inventory. The Cityworks system, along with the GIS will, at a minimum, house the following data and information:

- Age, condition, and location of the assets and associated attributes
- Asset size and/or capacity
- Asset construction material and manufacturer
- Installation date and expected service life
- Valuation data (e.g. original and replacement cost)
- Maintenance and performance history
- Preventative Maintenance requirements and frequencies
- Explanations and leadership approval of the cancellations

10. There Is A Lack Of Photographic Evidence For Utility Line Markings.

Utilities lacks adequate documentation of completed line markings, which could be used to identify responsible parties in the event of a damaged utility line.

Utilities Management confirmed attaching photographs to work orders will be part of the workflow with the future implementation of Cityworks. Cityworks will replace Maximo as a workflow

management system, as well as an asset management system. However, Cityworks is not expected to be implemented for several years.

The lack of functionality of Maximo prevents Utilities from attaching photographs to line marking work orders. In the event a utility line is damaged by a contractor, after being marked by Pinellas County Utilities, there can be disagreements as to who is responsible for required repairs. During the course of determining fault, Utilities Management stated it can become a battle of "he said, she said," as the line markings have already been dug up. It is during these events that Utilities can incur unnecessary expenses. Management stated Utilities splits repair costs, 50/50, with the contractor.

During the course of the audit, we visited project job sites, some of which included damaged utility pipes. Interviews with on-site contractors identified consistent concerns for pipes that were either not properly marked or not marked at all. During an on-site visit of a pipe break on Ulmerton Road, that was reportedly not marked at all, the contractor stated that this type of issue happens frequently.

Following the passing of The Underground Facility Damage Prevention and Safety Act in 1993, Florida Statute 556 requires excavators to have underground utility lines located by contacting Sunshine 811 two full business days before digging. Utilities currently utilizes a team of six employees to complete an average of 100 line marking requests received through the Sunshine 811 hotline daily.

Best practices for utility line marking, as outlined by Utility Locating Headquarters, which are based on best practices recommended by the National Utility Locating Contractors Association, states:

> *"Locate Technicians should always document what work was completed on a locate request."*

This documentation should include any supporting evidence, such as photographs, to document the marking job was completed accurately and appropriately.

While construction jobs may take several months, it is important to note Florida Statute 556.107(3) states:

> *"…stakes or other nonpermanent physical markings are considered valid for 30 calendar days after information is provided to the system under s.556.105(1)(a)."*

We recommend Management:

A. Require on-site photographs be taken for each Sunshine 811 line marking Maximo work order. The photographs should be maintained for a minimum of 30 days, and be readily available to staff and Management in the event of an issue.

B. Update applicable policies and procedures to incorporate the use of photographs for Sunshine 811 line marking Maximo work orders.

C. Continue with the implementation of Cityworks and utilize workflow features to include photographic evidence for utility line markings.

Management Response:

A. **Management Concurs.** Upon the selection of a collection method, pictures will be stored for a period of time that complies with record retention laws, policies, and procedures. The Department has contacted Sunshine 811 and vendors to research collection options.

B. **Management Concurs.** Upon the selection of a collection method, policies and procedures will be developed.

C. **Management Concurs.** Management will be working with the EAM project team to select an appropriate and compatible collection method.

Division of Inspector General

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