



**DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY**

Board of Directors

Audit Committee

Thursday, January 24, 2019

9:30 a.m.

- 1. **Call to Order**.....Anthony Giancola, Interim Chairperson
- 2. **FY 2018 Financial Statements**.....Matt Brown, CFO
- 3. **External Audit Exit Conference**.....KPMG
- 4. **Internal Audit Update**..... Dan Whelan, RSM, Auditor General
 - A. Internal Audit Plan Status Update
 - B. Status Update on Prior Audit Findings
 - C. **Integrated Work Order Management**
 - D. Mail Room Procedures
 - E. Hotline Update and Analysis
- 5. **Executive Session***Anthony Giancola, Interim Chairperson
- 6. **Adjournment**.....Anthony Giancola, Interim Chairperson

* The DC Water Board of Directors may go into executive session at this meeting pursuant to the District of Columbia Open Meetings Act of 2010, if such action is approved by a majority vote of the Board members who constitute a quorum to discuss: matters prohibited from public disclosure pursuant to a court order or law under D.C. Official Code § 2-575(b)(1); contract negotiations under D.C. Official Code § 2-575(b)(1); legal, confidential or privileged matters under D.C. Official Code § 2-575(b)(4); collective bargaining negotiations under D.C. Official Code § 2-575(b)(5); facility security under D.C. Official Code § 2-575(b)(8); disciplinary matters under D.C. Official Code § 2-575(b)(9); personnel matters under D.C. Official Code § 2-575(b)(10); proprietary matters under D.C. Official Code § 2-575(b)(11); decision in an adjudication action under D.C. Official Code § 2-575(b)(13); civil or criminal matters where disclosure to the public may harm the investigation under D.C. Official Code § 2-575(b)(14), and other matters provided in the Act.



Presentation to Audit Committee FY 2018 Financial Statements

January 24, 2019



FY 2018 Financial Overview

- The Authority's balance sheet remains strong and is growing.
 - Total net position of \$2.1 billion (increase of \$187.4 million or 9.9%)
- The Authority posted financial results from operations are generally in line with expectations and consistent with historical performance.
 - Operating revenues increased by \$41.3 million (6.4%) to \$684.5 million
 - Operating expenses increased by \$31.3 million (7.7%) to \$439.5 million
 - Total unrestricted cash & investments of \$232.0 million (vs. \$212.5 million in FY17)
 - Total restricted cash & investments of \$423.6 million (vs. \$299.0 million in FY17)
 - Total long-term debt, including current maturities, increased to \$3.5 billion (9.5% increase)
- Credit Rating Upgrades
 - Fitch ratings upgraded DC Water's credit rating for senior lien revenue bonds from Stable Outlook to Positive Outlook.



FY 2018 Financial Overview

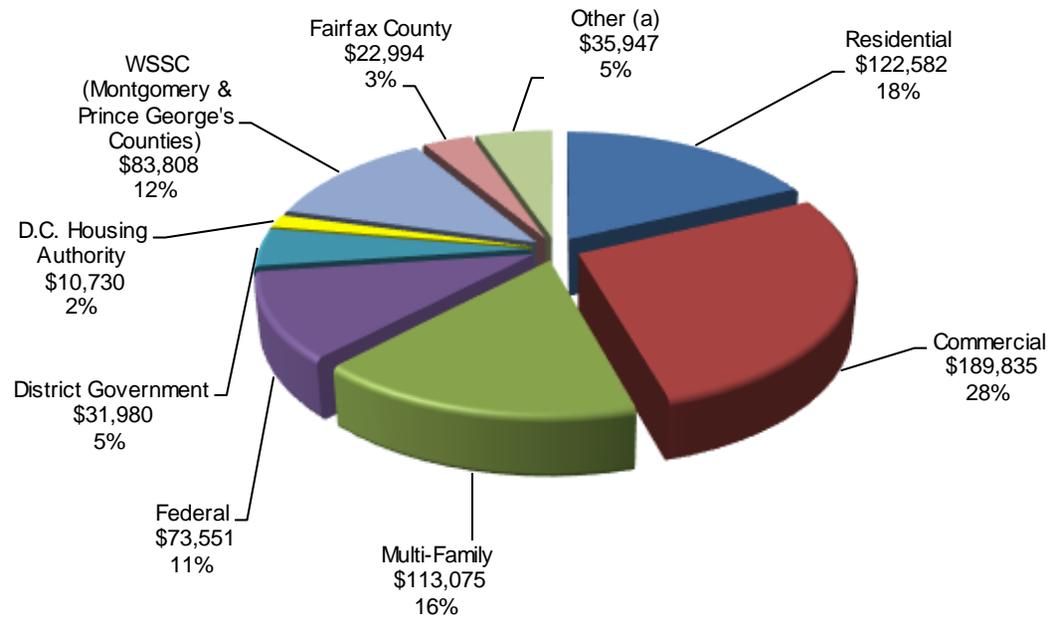
Summary of Fiscal Year 2018 Debt Financing

- The Authority issued \$100.0 million of 2018 Series A and \$200.0 million of 2018 Series B senior lien revenue bonds that mature in 2050 with fixed interest rates at 5.0%. The 2018 Series A bonds are being used to fund the Clean Rivers Project and the 2018 Series B bonds are being used to fund various capital improvements to the system.



FY 2018 Operating Revenues

- The Authority's operating revenues remain well diversified and stable.



(a) Other revenues include \$12.3 million from Loudoun County and \$2.8 million from Potomac Interceptor.



FY 2018 Operating Revenues

- The Authority's operating revenues increased by \$41.3 million (6.4%) to \$684.5 million.

	FY 2018	FY 2017
Residential, commercial and multi-family customers	\$ 425,492	\$ 401,246
Federal government	73,551	67,672
District government and D.C. Housing Authority	42,710	40,483
Charges for wholesale wastewater treatment	121,961	101,619
Other	20,788	32,149
Total operating revenues	<u>\$ 684,502</u>	<u>\$ 643,169</u>



FY 2018 Operating Expenses

- The Authority's operating expenses increased by \$31.3 million (7.7%) to \$439.5 million.

	FY 2018	FY 2017
Personnel services	\$ 142,342	\$ 132,124
Contractual services	74,627	72,611
Chemicals, supplies and small equipment	31,152	33,381
Utilities and rent	26,163	24,262
Depreciation and amortization	115,453	97,900
Water purchases	28,357	26,796
Payment in lieu of taxes and right of way fee (note 13)	21,376	21,057
Total operating expenses	\$ 439,470	\$ 408,131

- Personnel services and depreciation expense were the primary drivers.



FY 2018 Net Capital Assets

- The Authority's net capital assets, including construction in progress and less depreciation, increased by \$416.8 million (or 6.4%) to \$7.0 billion.

	As of September 30,		
	2018	2017	2016
Wastewater treatment plant	\$ 3,213,907	\$ 3,010,074	\$ 2,383,176
Wastewater collection facilities	858,060	856,859	843,095
Water distribution system	1,125,358	1,112,458	1,095,216
Deep tunnel system	1,171,226	-	-
Purchased capacity	364,211	356,850	349,210
Capital equipment	296,295	253,437	220,584
Construction in progress	1,574,081	2,489,255	2,544,698
Less accumulated depreciation	(1,643,270)	(1,535,833)	(1,440,632)
Net capital assets	<u>\$ 6,959,868</u>	<u>\$ 6,543,100</u>	<u>\$ 5,995,347</u>



water is life FY 2018 Change in Net Position

- The Authority's net position increased by \$187.4 million (or 9.9%) to \$2.1 billion.

	Fiscal Year		
	2018	2017	2016
Operating revenues	\$ 684,502	\$ 643,169	\$ 595,789
Operating expenses	439,470	408,131	388,384
Net non-operating revenues (expenses)	<u>(88,090)</u>	<u>(64,553)</u>	<u>(66,489)</u>
Change in net position before capital contributions	156,942	170,485	140,916
Capital contributions	<u>30,419</u>	<u>24,066</u>	<u>32,431</u>
Change in net position	187,361	194,551	173,347
Net position - beginning of year	<u>1,897,840</u>	<u>1,703,289</u>	<u>1,529,942</u>
Net position - end of year	<u><u>\$ 2,085,201</u></u>	<u><u>\$ 1,897,840</u></u>	<u><u>\$ 1,703,289</u></u>



DC Water and Sewer Authority

Audit results

Financial statement and Uniform Guidance audits for the year ended September 30, 2018

January 24, 2019

Agenda

- 1. Financial statement audit results**
- 2. Significant accounting policies and practices**
- 3. Audit misstatements**
- 4. Internal control related matters**
- 5. Significant deficiencies and material weaknesses in internal control**
- 6. Required communications and other matters**
- 7. Independence**
- 8. Uniform Guidance Audit (Single Audit)**
- 9. Appendix**



Financial statement audit results

Opinion on the Basic Financial Statements

— Unmodified or “clean” opinion

Report on Internal Control Over Financial Reporting and on Compliance with Laws, Regulations, Contracts and Grants in Accordance with *Government Auditing Standards*

— No material weaknesses or significant deficiencies reported

— No instances of non-compliance reported

Management Letter

— Control deficiencies noted



Significant accounting policies and practices

Significant accounting policies

- Described in Note 2 of the basic financial statements
- No new or changed accounting policies in FY 2018
- No new accounting pronouncements had a material effect on the financial statements in FY 2018

Significant accounting estimates

- No significant accounting estimates were identified in the process used by management to prepare the financial statements

Significant financial statement disclosures

- None noted



Significant accounting policies and practices (cont'd)

Recently adopted GASB standards for FY18

No.	Title	Impact on DC Water's Financial Statements?
75	Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions	None
81	Irrevocable Split-Interest Agreements	None
85	Omnibus 2017	None
86	Certain Debt Extinguishment Issues	None

Significant accounting policies and practices (cont'd)

GASB Pronouncements to be Implemented in the Future

No.	Title	Required implementation date (Period beginning after)	Authority fiscal year
83	Certain Asset Retirement Obligations	June 15, 2018	2019
84	Fiduciary Activities	December 15, 2018	2020
87	Leases	December 15, 2019	2021
88	Certain Disclosures Related to Debt, including Direct Borrowings and Direct Placements	June 15, 2018	2019
89	Accounting for Interest Cost Incurred before the End of a Construction Period	December 15, 2019	2021
90	Majority Equity Interests	December 15, 2018	2020

Audit misstatements

Uncorrected Audit Misstatements		
Description of misstatement	Quantitative effect on Net Position (Debit (Credit)) (in \$ thousands)	Quantitative effect on Change in Net Position (Debit (Credit)) (in \$ thousands)
	Dual Method	Dual Method
1. To reclassify the loss on disposal of capital assets for meters taken out of service in FY18 from interest expense and other non-operating expenses to depreciation expense for the current year portion and beginning net position for the portion relating to FYs 2015 to FY 2017; and to adjust the book values of meters not yet or planned to be disposed that currently are being depreciated over a 60 year useful life down to their adjusted net book values based on the revised estimated useful lives.	\$8,774	\$(1,425)
2. To reclassify bad debt expense of \$3,359 from non-operating expense to operating expense.	-	-
Total	\$8,774	\$(1,425)
Net Position/Change in Net Position	\$(2,085,201)	\$(187,361)
Percentage	(0.42)%	0.76%

Audit misstatements (continued)

Corrected Audit Misstatements			
Description of misstatement	Debit \$(Thousands)	Credit \$(Thousands)	Effect on financial reporting process
To record the effect of using a useful life of 60 years for the Anacostia River tunnel assets that were placed in service in FY 2018, which is inconsistent with management's useful life policy of 100 years. Accumulated Depreciation Depreciation and Amortization Expense	\$3,904	\$3,904	Control deficiency
To record the effect of overstating capital accounts payable accrual. Accounts Payable Construction in Progress	4,204	4,204	Control deficiency
To correct errors in the statement of cash flows related to adjustments for non-cash items which had a the net effect of understating cash flows from operating activities by \$17,878 and overstating cash flows from Capital and Related Financing Activities by the same amount.	NA	NA	Control deficiency

Internal control related matters

KPMG responsibilities

- The purpose of our audit was to express an opinion on the financial statements
- Our audit included consideration of internal control over financial reporting in order to design audit procedures that are appropriate in the circumstances but not for the purpose of expressing an opinion on the effectiveness of internal control.
- We are not expressing an opinion on the effectiveness of internal control
- Our consideration of internal control was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies, and therefore, material weaknesses or significant deficiencies may exist that were not identified.

Material weakness

A deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis. A reasonable possibility exists when the likelihood of an event occurring is either reasonably possible or probable. Reasonably possible is defined as the chance of the future event or events occurring is more than remote but less than likely. Probable is defined as the future event or events are likely to occur.

Significant deficiency

A deficiency, or a combination of deficiencies, in internal control over financial reporting that is less severe than a material weakness yet important enough to merit attention by those charged with governance.

Significant deficiencies and material weaknesses in internal control

Material weaknesses

— None noted

Significant deficiencies

— None noted

All other deficiencies in ICOFR noted during our audit that are of sufficient importance to merit management's attention have been communicated to management.

Required communications and other matters

Type	Response
Related parties	No significant findings and issues arising during the audit in connection with the entity's related parties.
Fraud	No actual or suspected fraud involving [group or component] management, employees with significant roles in internal control, or others when fraud results in a material misstatement in the financial statements were identified during the audit.
Noncompliance with laws and regulations	No matters to report.
Subsequent events	No matters to report.
Significant difficulties, if any, encountered during the audit	No matters to report.
Disagreements with management, if any	No matters to report.

Type	Response
Significant findings or issues discussed, or the subject of correspondence, with management	No matters to report.
Management's consultation with other accountants	No matters to report.
Other findings or issues	No matters to report.
Written representations	Management representation letter(s), including summary of uncorrected and corrected misstatements to be distributed under separate cover.

Independence

Non-audit services or other relationships that may reasonably be thought to bear on independence include:

- Green bond report attestation
- 2nd Quarter agreed-upon procedures
- Allowable advisory services to assist with the requirements definition, business process analysis, and vendor selection activities for modernization of the Enterprise Resource Planning system

In our professional judgment, we are independent with respect to the Authority, as that term is defined by the professional standards.

Uniform Guidance Audit Results (Single Audit)

Major program tested

— CFDA# 99.UNK, Combined Sewer Overflow

Opinion on Compliance For Major Program

Internal Control over Major Program

Report on Schedule of Expenditures of Federal Awards Required by the Uniform Guidance





Appendix

Contents	Page
Responsibilities	15

Responsibilities

Management responsibilities – Financial statements	<ul style="list-style-type: none"> — Preparation and fair presentation of the financial statements, including disclosures in conformity with U.S. GAAP — Adjusting the financial statements to correct material misstatements and affirming in the representation letter that the effects of any uncorrected misstatements aggregated by the auditor are immaterial, both individually and in the aggregate, to the financial statements taken as a whole
Management responsibilities – ICFR	<ul style="list-style-type: none"> — Design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error
Management responsibilities – Other	<ul style="list-style-type: none"> — To provide the auditor with: <ol style="list-style-type: none"> 1) access to all information of which management is aware is relevant to the preparation and fair presentation of the financial statements, such as records, documentation, and other matters; 2) additional information that the auditor may request from management for the purpose of the audit; and 3) unrestricted access to persons within the entity from whom the auditor determines it necessary to obtain audit evidence — Identifying and ensuring that the Company complies with laws and regulations applicable to its activities, and for informing the auditor of any known material violations of such laws and regulations — Providing the auditor with a letter confirming certain representations made during the audit, that includes but is not limited to management's: <ol style="list-style-type: none"> 1) disclosure of all significant deficiencies, including material weaknesses, in the design or operation of internal controls that could adversely affect the Company's financial reporting 2) acknowledgement of their responsibility for the design, implementation, and maintenance of internal controls to prevent and detect fraud
Audit Committee responsibilities	<ul style="list-style-type: none"> — Oversight of the financial reporting process and ICFR — Oversight of the establishment and maintenance by management of programs and controls designed to prevent, deter, and detect fraud
Management and the Audit Committee responsibilities	<ul style="list-style-type: none"> — Setting the proper tone and creating and maintaining a culture of honesty and high ethical standards — Ensuring that the entity's operations are conducted in accordance with the provisions of laws and regulations, including compliance with the provisions of laws and regulations that determine the reported amounts and disclosures in the entity's financial statements.

The audit does not relieve management or the Audit Committee of their responsibilities.

Responsibilities (continued)

<p>KPMG – Audit objectives</p>	<ul style="list-style-type: none"> — Forming and expressing an opinion about whether the financial statements that have been prepared by management with the oversight of the Audit Committee are prepared, in all material respects, in accordance with U.S. GAAP
<p>KPMG responsibilities – Audit</p>	<ul style="list-style-type: none"> — Performing the audit in accordance with U.S. GAAS and that the audit is designed to obtain reasonable, rather than absolute, assurance about whether the financial statements as a whole are free from material misstatement — Performing an audit of financial statements includes consideration of internal control over financial reporting as a basis for designing audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity’s internal control over financial reporting
<p>KPMG responsibilities – Other information in documents containing financial statements</p>	<ul style="list-style-type: none"> — The auditors’ report on the financial statements does not extend to other information in documents containing audited financial statements, excluding required supplementary information — The auditor’s responsibility is to make appropriate arrangements with management or the Audit Committee to obtain information prior to the report release date and to read the other information to identify material inconsistencies with the audited financial statements or misstatement of facts — Any material inconsistencies or misstatement of facts that are not resolved prior to the report release date, and that require revision of the other information, may result in KPMG modifying or withholding the auditors’ report or withdrawing from the engagement — Communicate any procedures performed relating to the other information and the results of those procedures.

Responsibilities (continued)

<p>KPMG responsibilities – Communications</p>	<ul style="list-style-type: none"> — Communicating significant matters related to the financial statement audit that are in our professional judgment, relevant to the responsibilities of the Audit Committee in overseeing the financial process. U.S. GAAS does not require us to design procedures for the purpose of identifying matters to communicate to the Audit Committee — Communicating if we suspect or identify noncompliance with laws and regulations exist, unless matters are clearly inconsequential — Communicating to management and the Audit Committee in writing all significant deficiencies and material weaknesses in internal control identified during the audit, including those that were remediated during the audit and reporting to management in writing all deficiencies noted during our audit that, in our professional judgment, are of sufficient importance to merit management’s attention. The objective of our audit of the financial statements is not to report on the Company’s internal control — Conducting the audit in accordance with professional standards and complying with the rules and responsibility of the Code of Professional Conduct of the American Institute of Certified Public Accountants and the official standards of relevant CPA Societies, and relevant state boards of accountancy — Communicating to the Audit Committee circumstances, if any, that affect the form and content of the auditors’ report — Communicating if we plan to withdraw from the engagement and the reasons for the withdrawal — Communicating to the Audit Committee if we conclude no reasonable justification for a change of the terms of the audit engagement exists and we are not permitted by management to continue the original audit engagement — When applicable, we are also responsible for communicating particular matters required by law or regulation, by agreement with the entity, or by additional requirements applicable to the engagement — Communicating if we have identified or suspect fraud involving; (a) management, (b) employees who have significant roles in internal control, (c) others, when the fraud results in a material misstatement in the financial statements, and (d) other matters related to fraud that are, in the auditors’ professional judgment, relevant to the responsibilities of the Audit Committee — Communicating significant findings and issues arising during the audit in connection with the entity’s related parties. — Communicating conditions and events, considered in the aggregate, that raise substantial doubt about an entity’s ability to continue as a going concern for a reasonable period of time
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DC WATER

Audit Committee Meeting



January 24, 2019

Agenda

- FY 2019 Internal Audit Plan Status Update
- Status Update on Prior Audit Findings
- Report on Completed Audits:
 - Work Order Management
 - Mail Room Procedures
- Hotline Update

AUDIT PLAN STATUS UPDATE – FY19

Internal Audit Plan Status Update

Audit	Status
FY 2018	
Integrated Work Order Management	Report Complete
FY 2019	
Permit Operations - Reimbursable Projects	Reporting in Progress
Mail Room Procedures	Report Complete
Fleet Management	Fieldwork In Progress
Legal Operations	Planning In Progress
Occupational Safety and Health	Planning In Progress
Automated Meter Reading Final Progress Report	Not Started
Cloud Security Rapid Assessment	Not Started
Active Directory Cloud Migration Security Review	Not Started
Wifi Security Testing	Not Started
CIS Application Security SOD Review	Not Started
Contractual Services	Not Started
Asset Management	Not Started
Physical Security and Social Engineering Testing	Not Started
Remediation Follow Up Procedures	On-going
Hotline Management	On-going

Internal Audit Plan FY 2019 Timeline

	Nov - 18	Dec - 18	Jan - 19	Feb - 19	Mar - 19	Apr - 19	May - 19	Jun - 19	Jul - 19	Aug - 19	Sep - 19	Oct - 19
▶ Mail Room Operations		■										
▶ Permit Operations - Reimbursable Projects	■	■	■	■								
▶ Fleet Management	■	■	■	■								
▶ Legal Operations			■	■	■	■	■					
▶ Occupational Safety and Health			■	■	■	■	■					
▶ AMR				■	■	■	■					
▶ Cloud Security Rapid Assessment					■	■	■	■				
▶ AD Cloud Migration Security Review					■	■	■	■				
▶ Wifi Security Testing						■	■	■	■			
▶ CIS Application Security SOD Review							■	■	■	■		
▶ Contractual Services							■	■	■	■		
▶ Asset Management									■	■	■	■
▶ Physical Security and Social Engineering									■	■	■	■
▶ Ongoing Follow-up Procedures	■	■	■	■	■	■	■	■	■	■	■	■
▶ Ongoing Hotline Monitoring	■	■	■	■	■	■	■	■	■	■	■	■

Additional Risk Assessment Interviews

At the request of management on 12/7/2018, we performed additional FY19 Risk Assessment interviews due to the recent reorganization and transition at the Authority. The intent of those meetings was to determine whether the 10/26/2018 audit plan was still appropriate and relevant, and refocus efforts as needed.

Additional interviews were as follows:

- Armon Curd (1/9/19)
- Carolyn MacKool (12/20/2018)
- David Gadis (1/4/19)
- George Spears (12/18/18)
- Gregory Hope (12/19/18)
- Howard Gibbs (1/9/19)
- Ivelisse Cassas (12/21/18)
- Maureen Holman (12/18/18)
- Mustaafa Dozier (12/19/18)
- Rachna Butani (1/3/19)
- Roger Brown (12/18/18)
- Sarah Motsch (1/4/19)
- Tony Giancola (12/21/18)
- Bonnie Kirkland (1/15/19)

FY19 and FY20 Proposed Audit Plans

As a result of the meetings and additional projects that were requested by management and the Board, the FY19 audit plan has been adjusted as shown below, as well as a proposed FY20 audit plan has been developed.

Projects added to the plan:

- Mail Room Procedures – Added to the plan due to concerns around Board members not receiving items addressed to the Board
- Legal Operations – Added to the plan due to transition and organizational assessment
- AMR Final Progress Report – Added to the plan as a result of project completion and punch list of items to complete
- Cloud Security Rapid Assessment
- Active Directory Cloud Migration Security Review
- CIS Application Security SOD Review
- IT Physical Security and Social Engineering Testing

Projects removed from the plan:

- DETS Procurement Pre-Award & Selection – moved to FY20 due to a division re-assessment occurring during FY19
- Facilities Maintenance – moved to FY20 due to the addition of 3 projects to the plan
- IT Risk Management and Compliance – removed from the plan due to embedding this competency into each functional audit, and proposing 4 additional IT projects to the plan
- IT Records Management – removed from the plan due to the addition of 4 additional IT projects to the plan; will consider for FY20 plan
- IT Mobile Platform Assessment - moved to FY20 plan due to the addition of 3 additional projects to the plan

FY19 and FY20 Proposed Audit Plans

As a result of the meetings and additional projects that were requested by management and the Board, the proposed FY20 audit plan has been developed. This proposed plan will be revisited prior to the end of FY19. As always, projects included on the FY19 and FY20 plans may be interchanged as risks and timing needs change.

- FY 2020 Risk Assessment
- Engineering Procurement Pre-Award & Selection
- Facilities Maintenance
- Reimbursable Projects – Permit Operations Phase 2
- Asset Management – Phase 2
- Contract Compliance – Cycle Audit
- Strategic Plan Monitoring – Cycle Audit
- Office of Emergency Management – Phase 2
- Customer Complaint Management
- Enterprise Risk Management

PRIOR AUDIT FINDINGS – FOLLOW UP STATUS

Status Update on Prior Audit Findings

Audit Report/Subject	Report Issue Date	Corrective Actions			
		Total	Open	Closed	Pending Testing ¹
Prior to FY 2015 Audit Findings²					
Water Services - Distribution Maintenance Branch	10/28/2013	1	0	1	0
GIS Mapping	06/23/2014	2	0	2	0
	Total	3	0	3	0
FY 2015 Audit Findings					
IT Vendor Management	12/21/2015	6	0	6	0
	Total	6	0	6	0

Color Key	
	Remediation is past due for at least 1 issue
	At least 1 original remediation target date has been extended

All prior to FY15 and FY15 audit findings are now closed.

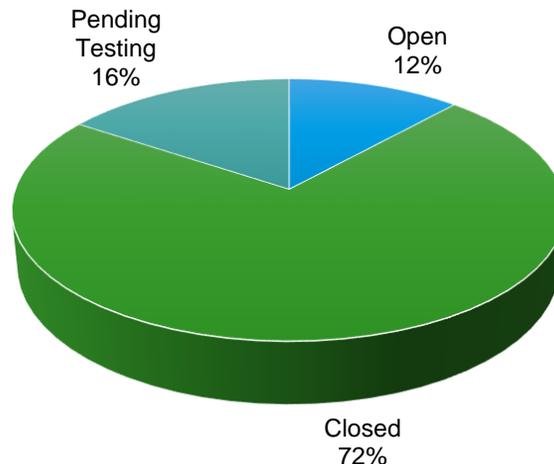
¹ "Pending Testing" indicates that Management represents that the Action Plan is Completed, but Internal Audit has not yet performed testing to validate the status.

² The table above represents the findings that remain open, are currently pending testing or were closed since the last Audit Committee meeting. RSM originally inherited 82 prior audit findings in October 2014; there were 71 total audit findings in FY 2015.

Status Update on Prior Audit Findings (continued)

Audit Report/Subject	Report Issue Date	Corrective Actions			
		Total	Open	Closed	Pending Testing ¹
FY 2016 Audit Findings					
Overtime Audit and Analysis	01/21/2016	3	1	2	0
Contract Compliance and Monitoring Part I	04/28/2016	4	0	4	0
Contract Compliance and Monitoring Part II	07/28/2016	11	2	9	0
ROCIP Savings Analysis	07/28/2016	4	0	4	0
Training, Licensing & Certification	07/28/2016	7	1	4	2
Blue Horizon 2020 Strategic Plan Monitoring	11/18/2016	3	0	0	3
Incident Management and Response Review	11/18/2016	3	0	1	2
Engineering – Contractor Management Phase II	2/14/2017	4	0	4	0
Billing & Collection	2/14/2017	1	0	1	0
Business Development Plan	2/14/2017	10	1	8	1
Annual Budgeting and Planning	4/27/2017	1	1	0	0
	Total	51	6	37	8

Color Key	
	Remediation is past due for at least 1 issue
	At least 1 original remediation target date has been extended

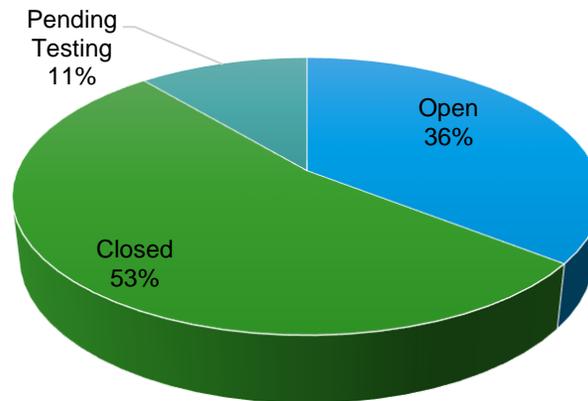


¹ "Pending Testing" indicates that Management represents that the Action Plan is Completed, but Internal Audit has not yet performed testing to validate the status.

Status Update on Prior Audit Findings (continued)

Audit Report/Subject	Report Issue Date	Corrective Actions			
		Total	Open	Closed	Pending Testing ¹
FY 2017 Audit Findings					
DMS Work Order Management (Blue Plains)	4/27/2017	4	1	1	2
HR/Employee Privacy Review	4/27/2017	7	4	3	0
Purchasing Card	4/27/2017	6	0	4	2
Contract Monitoring & Compliance Part 1	7/27/2017	5	0	5	0
Contract Monitoring & Compliance Part 2	7/27/2017	3	0	3	0
Entity Level Assessment	10/26/2017	7	5	2	0
Vulnerability Management and Platform Technical Audit (Windows/UNIX)	10/26/2017	2	2	0	0
Materials Management – Operations and Inventory	10/26/2017	4	2	1	1
Fleet – Accident and Incident Reporting	1/25/2018	4	2	2	0
Construction Plan Review and Permitting	1/25/2018	3	0	3	0
	Total	45	16	24	5

Color Key	
	Remediation is past due for at least 1 issue
	At least 1 original remediation target date has been extended

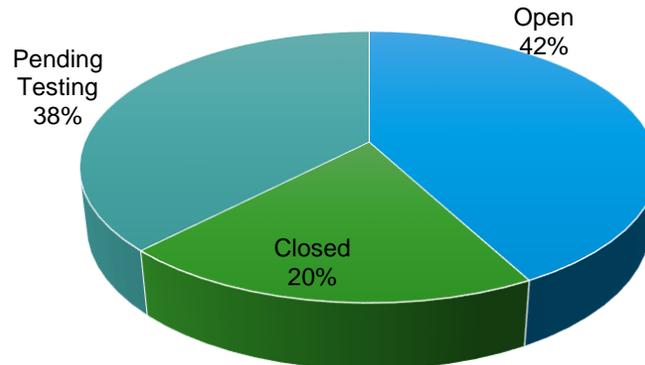


¹ “Pending Testing” indicates that Management represents that the Action Plan is Completed, but Internal Audit has not yet performed testing to validate the status.

Status Update on Prior Audit Findings (continued)

Audit Report/Subject	Report Issue Date	Corrective Actions			
		Total	Open	Closed	Pending Testing ¹
FY 2018 Audit Findings					
Recruiting, Selection and On-Boarding	4/26/2018	2	0	2	0
Automated Meter Replacement Update	4/26/2018	1	0	0	1
DB/OS Privileged User	4/26/2018	4	0	2	2
Network Penetration Testing	4/26/2018	13	0	5	8
Contract Monitoring & Compliance	7/26/2018	3	3	0	0
Crisis Management/Business Continuity	7/26/2018	3	3	0	0
Payroll & Timekeeping	10/25/2018	4	2	0	2
Accounts Payable	10/25/2018	5	1	0	4
Integrated Work Order Management	1/24/2019	10	10	0	0
	Total	45	19	9	17

Color Key	
	Remediation is past due for at least 1 issue
	At least 1 original remediation target date has been extended



¹ "Pending Testing" indicates that Management represents that the Action Plan is Completed, but Internal Audit has not yet performed testing to validate the status.

Action Deferred Update

The following items are considered “action deferred” items that are contingent on other action occurring and not included in the Prior Audit Findings Update slides above:

1. Comprehensive Safety Policies and Procedures handbook
 - Online comment period closed and comments were addressed
 - Pending hiring of new Director, Occupational Safety and Health prior to finalizing
2. Scrap Metal Policy
 - Policy has been finalized; pending signature
3. Personally Identifiable Information (PII) Policy
 - Policy has been finalized; pending signature
4. Intellectual Property Personnel Policy
 - Under review by management based on new strategic initiatives

INTERNAL AUDIT OF INTEGRATED WORK ORDER MANAGEMENT

Integrated Work Order Management

The scope of the Integrated Work Order Management Internal Audit within the Department of Pumping Operations (DPO), the Department of Sewer Operations (DSO), and the Department of Water Operations (DWO) including the following:

- Obtain an understanding of the Work Order Management process, including the policies and procedures, and controls in place;
- Determine the design effectiveness of those controls identified by testing a sample of closed work orders, and;
- Evaluate the use of the Maximo Computerized Maintenance Management System (CMMS).
- Evaluate the use of key performance indicators for periodic monitoring of the work order management process.

Integrated Work Order Management - DPO

Observations	Risk Rating
DPO – 1. Inconsistent Use and Non-Compliance of Approved Established Work Flow	High
<p>Management Action Plan:</p> <ol style="list-style-type: none"> DPO has taken a proactive step of resending its Work management SOP to its entire staff. DPO will continue to harp on the importance of ensuring that its workorder records were processed in a timely fashion and per laid down procedures and policies. Target Date: Complete All DPO personnel have been trained on Maximo best practices. Target Date: Complete DPO will develop QAQC (“Quality Assurance Quality Control”) report that will identify workorders were stalled on a status over unacceptable period, do not have all the identified required fields. Target Date: January 31, 2019 DPO is currently working with IT to resolve all the issues that hinders the routing of PM workorders through the existing workflow process. Target Date: January 11, 2019 	

Integrated Work Order Management - DSO

Observations	Risk Rating
<p>DSO – 1 . Inconsistent Supervisory Review of Work Orders within Maximo</p> <p>Management Action Plan: Currently, in the preliminary phase, DSO is creating Maximo work flow processes for all sections. The new work flow process is created to eliminate causes that lead to inconsistent application of supervisory review. DSO will also implement Maximo Basic Skill Level Training, which is currently in the scheduling and course preparation phase. The final deliverable will also include a document detailing work order management procedures and protocols.</p> <p>Target Date: January 1, 2019</p>	High
<p>DSO – 2 . Utilization of Maximo</p> <p>Management Action Plan: DSO is in communication with the IT, Maximo and Lawson teams, who are aware of DSO needs related to not adding material cost to individual work orders.</p> <p>Issues that have led to users being unable to enter complete labor hours to work orders have been addressed on an as-needed basis when Foremen are made aware by crew leads and during the work order review process; however, newly created work flows as identified in the response to Observation #1 will eliminate this issue going forward.</p> <p>Target Date: February 1, 2019</p>	High
<p>DSO – 3. Monitoring of Performance Metrics</p> <p>Management Action Plan: DSO currently monitors various KPIs such as (eg. CM 60+ days elapsed, EM 90+ days elapsed, etc.) which are reviewed on a timely basis by appropriate personnel. In conjunction with the existing KPI monitoring process, we will revise to streamline and align with best in class operations to coincide with the Authority's vision and priorities going forward.</p> <p>Target Date: Weekly, Beginning January 1, 2019</p>	High

Integrated Work Order Management - DWO

Observations	Risk Rating
DWO – 1 . Inconsistent Supervisory Review of Work Orders within Maximo	High
<p>Management Action Plan: DWO recently implemented the use of "Field Complete" status in some of the business processes to allow the field work associated with an activity to be completed while the management team reviews the data captured. We will continue to expand the current use of "Field Complete" status to allow staff to complete field work portion of the process while allowing the management team an opportunity to review and updated the work order accordingly prior to changing the status to "Complete." This expanded use of work order status will be evaluated across all work activities and implemented where deemed appropriate and supported by the business processes in place. Associated documentation and training will be provided to all impacted staff.</p> <p>Target Date: End of FY2020 (contingent on completion of asset data load by end of FY2018)</p>	
DWO – 2 . Utilization of Maximo	High
<p>Management Action Plan: Pending completion of the asset data load into Maximo, we will select teams for participation in a pilot program focusing on labor and materials entry into Maximo. Upon completion of the asset data load and pilot program, we will re-evaluate Maximo cost tracking across all work activities and implement where appropriate and supported by the business processes.</p> <p>The decision to invest time, energy, and resources into the expanding the current use and capabilities of Maximo to capture these costs will be made alongside the Finance Department and IT as they continue to evaluate the appropriate tools required to assist the authority in providing tools to better capture and analyze cost across multiple platforms. As discussed during this evaluation, it is our expectation that this effort will also include the completion of the linear asset data load effort currently underway that will assist our department in capturing all work related costs at the asset level.</p> <p>Target Date: Pilot program targeted for end of FY2020 (contingent upon completion of the asset data load by the end of FY2018)</p>	
DWO – 3. Monitoring of Performance Metrics	High
<p>Management Action Plan: We will review all submitted indicators and revise to streamline and align with best in class operations to coincide with the authority's vision and priorities going forward.</p> <p>Target Date: End of FY2020</p>	

MAIL ROOM PROCEDURES

Mail Room Procedures

In December 2018, it was brought to the attention of the Board and Management that two pieces of mail addressed to the Board Chairman were not received by the Chairman as expected. As a result, Internal Audit was requested to perform a review of mail room procedures.

Our scope included the following:

- Gain an understanding of DC Water mail room procedures, limited to the collection and distribution of inbound mail,
- Assess the process for deliveries addressed to Board members, or other high profile addressees,
- Investigate specific known instances of reported mail delivery failure to Board members, and
- Identify potential opportunities for process improvement.

Additionally, we reviewed the contents of the two items not received by the Board Chairman and evaluated the matters disclosed, as requested.

Mail Room Procedures

We have provided management with a memo detailing our results and the following recommendations:

1. Update the current SOP to include details regarding how mail is to be sorted and catalogued and who is responsible for the tasks. This could also include a list of higher profile senders, as well.
2. Higher profile items, such as those addressed to the Board, the CEO or General Counsel (or other parties as desired) should be separated, catalogued and then signed for by the recipient party to track proper distribution and receipt.

The Authority is in the process of switching to QTrak (an internal logistics system). It is our understanding that QTrak may allow for all mail items to be scanned and electronically signed for; the Authority intends to implement QTrak during FY2019.

HOTLINE UPDATE AND SEMI-ANNUAL ANALYSIS

Hotline Update

Hotline Calls as of 1/17/19	
Calls Open as of 10/25/18	1
Calls Received	6
Fraud Claims – 0	
Other – 6	
Cases Closed	3
Cases Currently Open	4

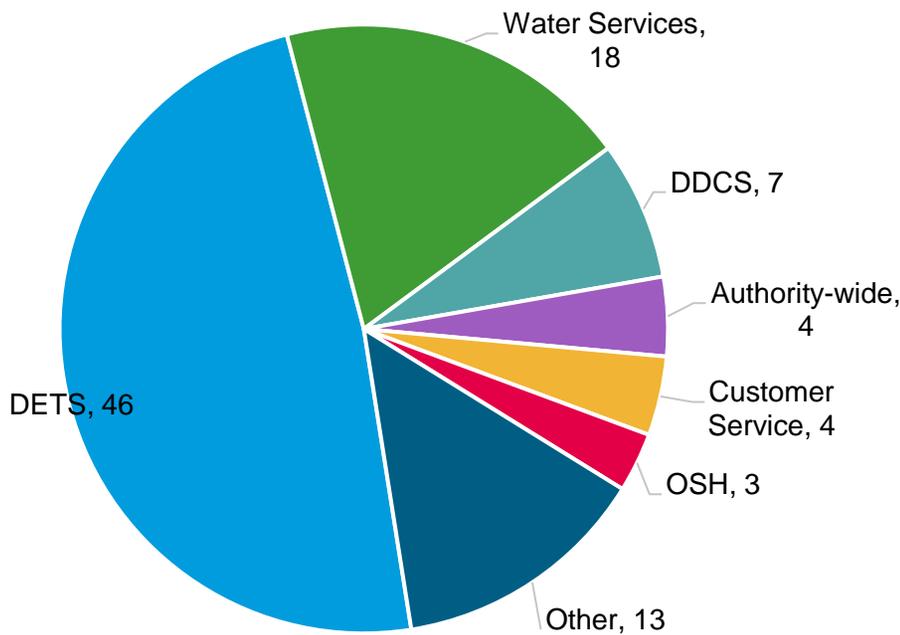
Total calls by Fiscal Year:

Year	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19
# of calls	10	20	16	36	31	21	7
Action Taken	0	2	7	7	2	0	0

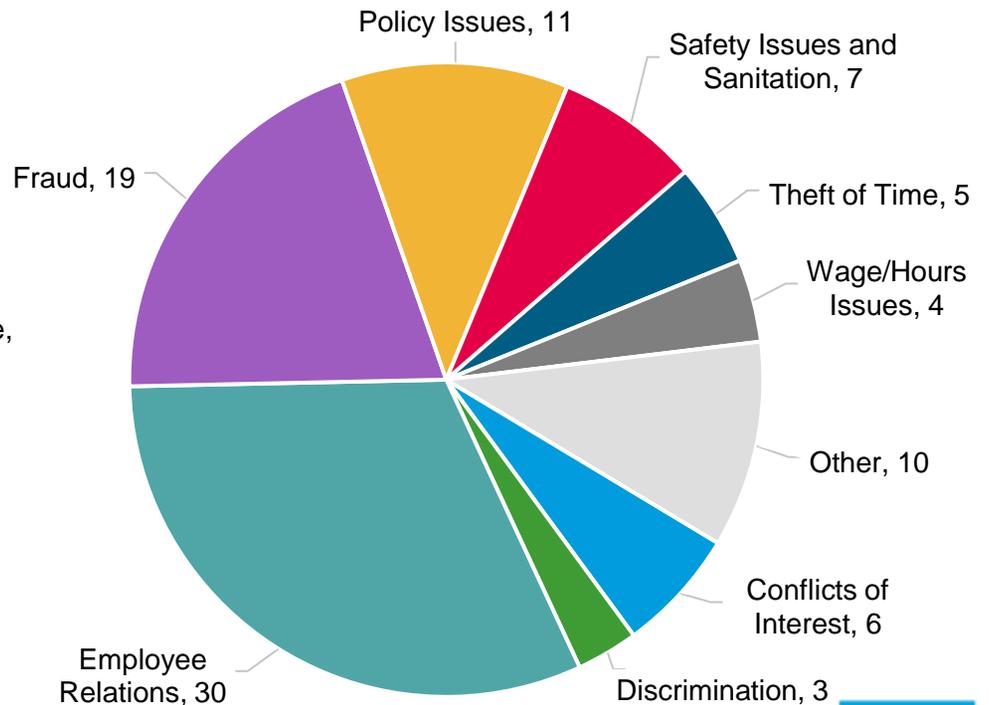
Hotline Call Analysis

We conducted an analysis of the 94 hotline calls that have been received since FY 2016 to date, to determine if there are any trends, evaluate the quantity of calls (allegations) that were substantiated, and other matrices. The following tables represent the breakdown of calls by Department and case type.

Calls by Department

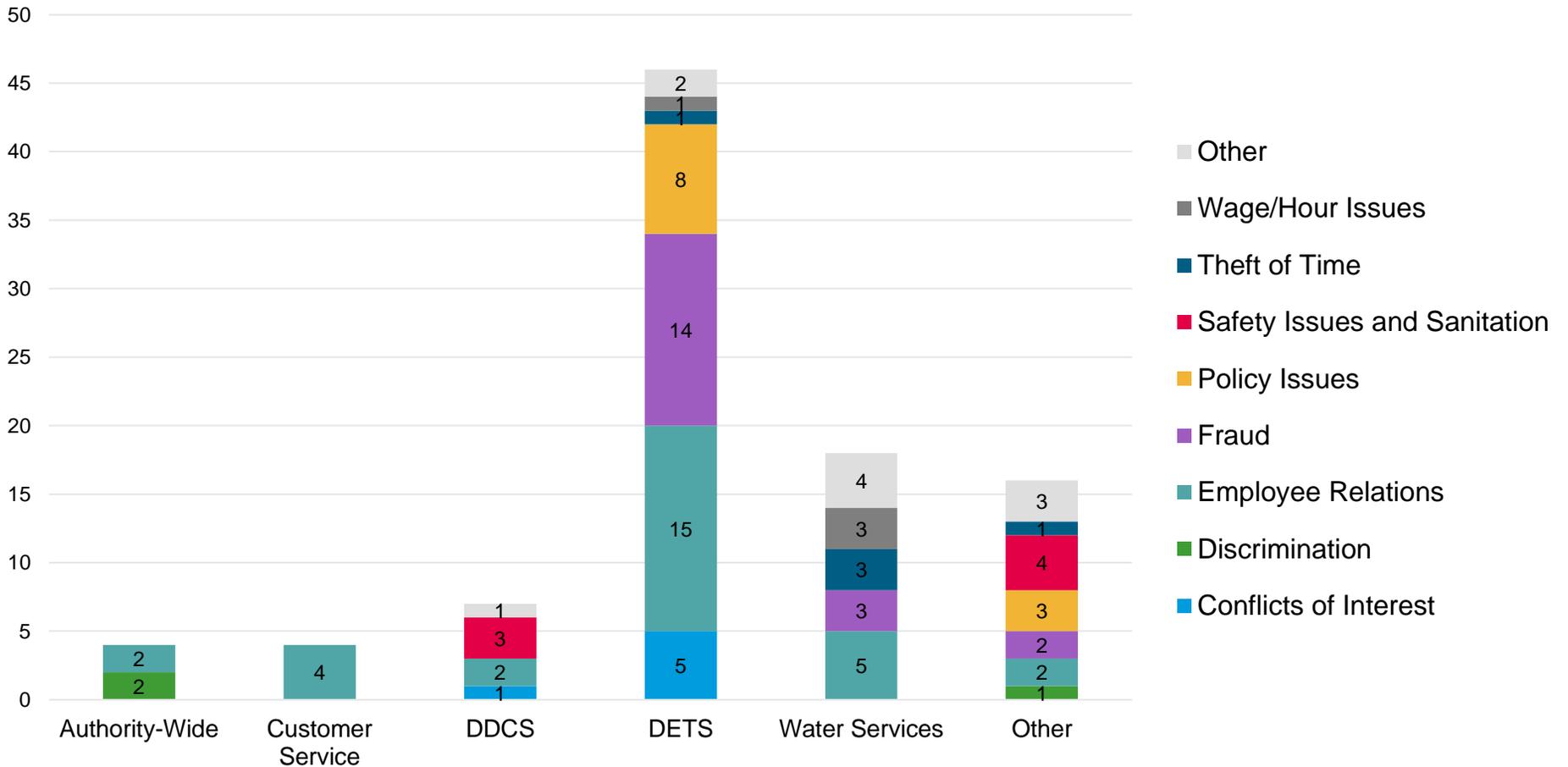


Calls by Case Type



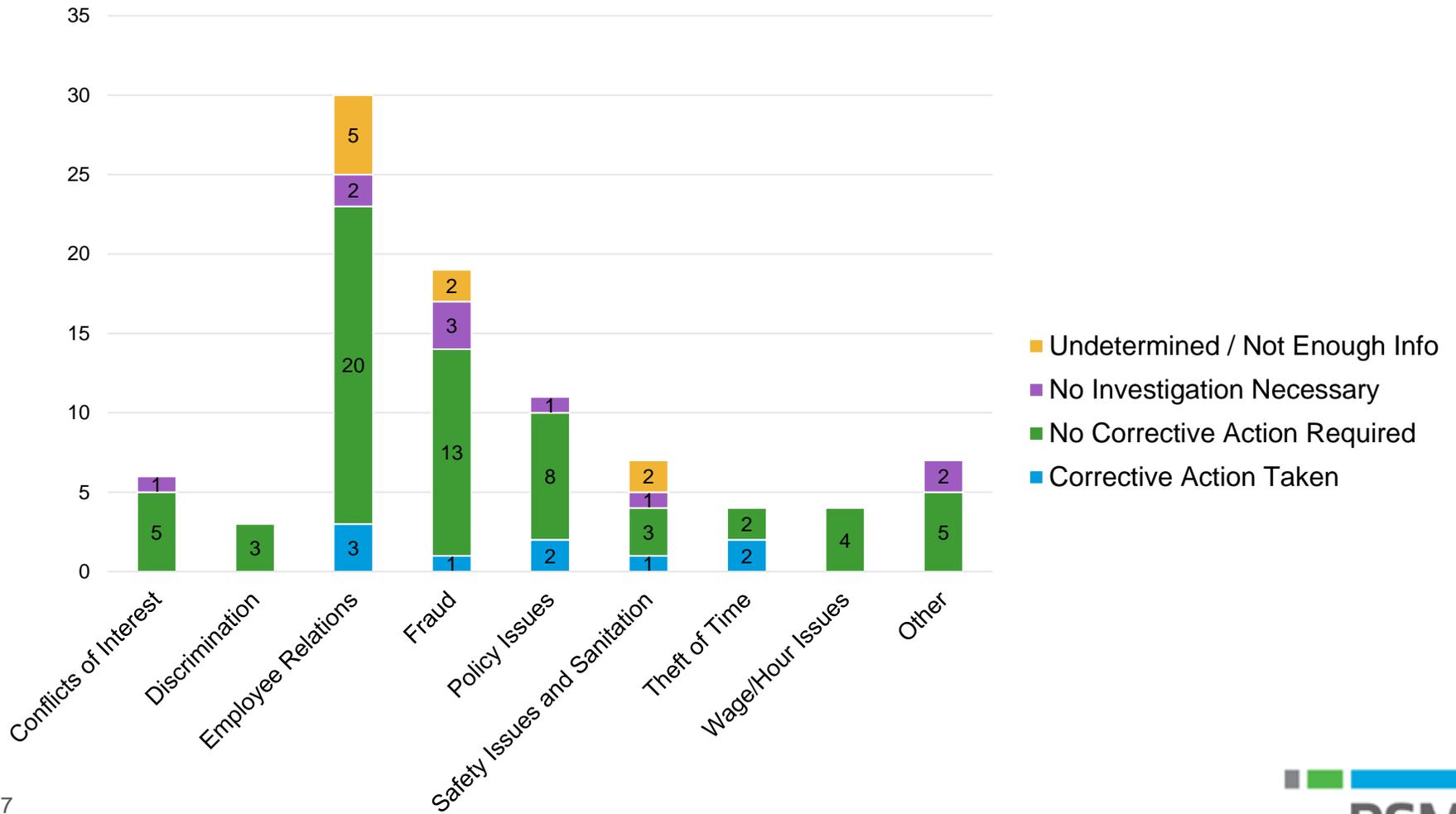
Hotline Call Analysis (continued)

Calls by Type and Department



Hotline Call Analysis (continued)

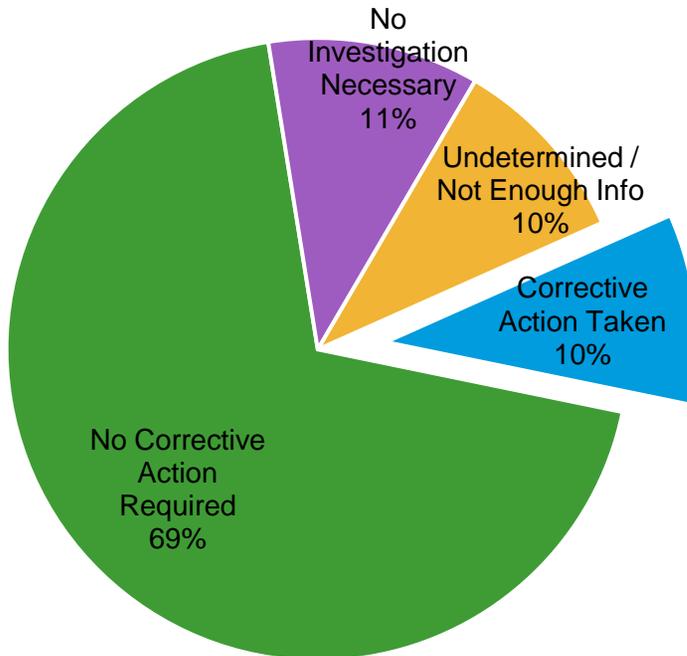
Calls by Type and Outcome



Hotline Call Analysis (continued)

The following tables represent the breakdown of hotline calls that were substantiated and required corrective action. Of the 91 cases closed, 10% or 9 calls resulted in corrective action.

Calls by Outcome Calls



Case Type	# of Calls
Employee Relations	3
Fraud	1
Policy Issues	2
Safety Issues and Sanitation	1
Theft of Time	2
Total	9

Department	# of Calls
DDCS	2
DETS	4
Maintenance Services	1
OSH	1
Water Services	1
Total	9

OTHER TOPICS

General Housekeeping

- COTR Update
- Frequency of Meetings
- Board / Audit Committee Orientation
- Risk Assessment Comments – updated listing to management

QUESTIONS AND ANSWERS?

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Internal Audit Report Integrated Work Order Management

January 2019



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Work Order Management Internal Audit
Internal Audit Report
Issued: January 2019



TRANSMITTAL LETTER

January 2019

The Audit Committee of DC Water
 5000 Overlook Avenue, SW
 Washington, DC 20032

Pursuant to the approved 2018 internal audit plan for the District of Columbia Water and Sewer Authority (“DC Water” or the “Authority”), we hereby present the results of our Integrated Work Order Management Internal Audit. We will be presenting this report to the Audit Committee of DC Water at the next scheduled meeting on January 24, 2019. Our report is organized in the following sections:

Executive Summary	This section provides a summary of the observations identified during our internal audit of the Integrated Work Order Management process.
Background	This section provides an overview of the Integrated Work Order Management process.
Objectives and Approach	The internal audit objectives and focus are expanded upon in this section, as well as a review of the various phases of our approach.
Detailed Observations	This section provides a description of the observations noted during our work and recommended actions as well as management’s response, responsible party, and estimated completion date.

We would like to thank the staff and all those involved in assisting the Internal Auditors in connection with this review.

Respectfully Submitted,

Internal Auditors





Work Order Management Internal Audit
 Internal Audit Report
 Issued: January 2019

EXECUTIVE SUMMARY

Background

Customer Care and Operations divisions are responsible for the daily operations of DC Water’s infrastructure and assets, providing direct services to customers. These departments are the Authority’s first responders for emergencies impacting customers and facilities overall. Three divisions were included in our review:

- *Department of Pumping Operations (DPO, formerly DDCS)* which oversees the Director’s Office & Emergency Management, maintains the pumping stations, SCADA process control, Potomac Interceptor, and the maintenance teams.
- *Sewer Operations (DSO)* which manages the Authority’s sewer infrastructure, including the waterways, and operates two primary branches for inspections and maintenance, and construction and repair.
- *Water Operations (DWO)* which oversees the Authority’s water infrastructure and involves distribution maintenance, distribution control, contract management, and linear asset management.

Each of the three in-scope divisions utilizes Maximo, a Computerized Maintenance Management System (CMMS), to analyze the thousands of work orders that are generated across the Authority’s service areas each year.

Overall Summary / Highlights

The observations identified during our assessment are summarized on the next few pages. We have assigned relative risk or value factors to each observation. Risk ratings are the evaluation of the projected severity of the concern and the potential impact on the operations of each item. Observations will require management action plans with estimated completion dates that will be included in the routine follow up of internal audit observations.

Objective and Scope

Our procedures were performed in accordance with the internal audit scope and approach set forth in our audit notification letter, dated April 4, 2018 and were limited to the procedures described therein.

Phase 1 of our engagement consisted of inquiry in an effort to obtain an understanding of the Authority’s structure and key processes within our scope. The primary objectives of our Phase 2 procedures, which were executed during the April 2018 to June 2018 timeframe, included the following:

- To assess the design of key controls, and testing of the operating effectiveness of those controls.
- To assess the operating effectiveness of key controls identified, through detailed testing of documentation within the following areas:
 - Work order initiation and screening
 - Work Planning and scheduling
 - Work execution and data entry
 - Work order closeout
 - Reporting and monitoring

The scope of our Work Order Management internal audit included the review of DPO, DSO and DWO work orders from the Maximo Computerized Maintenance Management System (CMMS) under the supervision of departmental personnel as well as testing of the operating effectiveness of key monitoring controls in-place for the Work Order management function.

Summary of Observation Ratings *(See Appendix A for definitions)*

	Number of Observations by Risk Rating		
	High	Moderate	Low
Work Order Management	7	3	-

We would like to thank all DC Water team members who assisted us throughout this review.





EXECUTIVE SUMMARY (CONTINUED)

Ratings and Conclusions

The following is a summary of all observations noted in the areas reviewed (see “Detailed Observations” section for additional information). Definitions of the rating scales is included in the Appendices.

Summary of Observations – DPO (formerly DDCS)	
Observations	Rating
<p>DPO - 1. INCONSISTENT USE AND NON-COMPLIANCE OF APPROVED ESTABLISHED WORK FLOW</p> <p>Based upon discussion with process owners, review of work flow documentation, and detailed testing of work orders, we noted the following deviations from the established work flows for each department:</p> <ul style="list-style-type: none"> • Some of the sampled work orders in PM (“Preventative Maintenance”) and PD (“Predictive Maintenance”) did not utilize the established work flow within Maximo. • Some of the non-PM sampled work orders in CM (“Corrective Maintenance”) and PROJ (“Project”) did not utilize the Planner/Scheduler function per the work order status history prior distributing the work order to a DPO worker. • Some of the sampled work orders tested in PM contained no evidence of Trade Foreman work documentation review and approval. 	High
<p>DPO - 2. UTILIZATION OF MAXIMO</p> <p>Through our detailed testing of work orders, and discussion with Management and key process owners, we noted that each department is not currently capturing all available cost data within Maximo. We noted the following uncaptured costs:</p> <ul style="list-style-type: none"> • Equipment usage and rental costs • Planner/scheduler labor 	Moderate



EXECUTIVE SUMMARY (CONTINUED)

Summary of Observations - DSO	
Observations	Rating
<p>DSO - 1. SUPERVISORY REVIEW OF WORK ORDERS WITHIN MAXIMO</p> <p>Based on our testing, we noted that some of the sampled work orders in CCTV (“CCTV Video Sewer Lines”), EM (“Emergency Maintenance”), EMERG (“Emergency Investigation”), and INSP (“Inspect”) did not contain evidence of Trade Foreman (supervisor) work documentation review and approval within Maximo.</p>	High
<p>DSO - 2. UTILIZATION OF MAXIMO</p> <p>Based on our testing of work orders, and discussion with Management and key process owners, we noted that DSO is not currently capturing all available cost data within Maximo. We identified the following:</p> <p><i>Costs not currently captured:</i></p> <ul style="list-style-type: none"> • Equipment usage and rental costs • Labor is recorded for crew lead's time is captured per work order; however, other crew member time is not recognized. • Materials are typically purchased in bulk on an open PO or administrative work order. Materials management work flow is utilized; however, individual work orders do not recognize material costs. <p><i>Data entry inconsistencies:</i></p> <ul style="list-style-type: none"> • Some of the sampled work orders in CCTV, EM and EMERG had zero labor hours entered into Maximo when labor hours should have been captured based upon work order descriptions and notes. 	High



EXECUTIVE SUMMARY (CONTINUED)

Summary of Observations	
Observations	Rating
<p>DSO - 3. MONITORING OF PERFORMANCE METRICS</p> <p>Based on our discussions with Management and key process owners, we noted that there is currently not a consistent, timely, and documented process for the recurring monitoring of high-level key performance metrics (although management does routinely review some limited and informal information).</p> <p>Examples of critical metrics identified and through discussions with management included the following:</p> <ul style="list-style-type: none"> • Work order scheduled date vs. actual complete date • Work order planned labor hours vs actual hours to complete • Labor / staffing utilization • Work order backlog, overall and by trade / specialty 	High
<p>DSO - 4. INCOMPLETE POLICIES AND PROCEDURES</p> <p>Based on our testing of work orders, we noted several instances of potential noncompliance with policies as a result of unclear requirements within established policies and procedures. For example:</p> <ul style="list-style-type: none"> • Policies and procedures relevant to the DSO Work Order Management process do not define requirements specific to PM or CM work orders. • Policies and procedures do not clearly define the work order data required to be entered into the Maximo system. 	Moderate



EXECUTIVE SUMMARY (CONTINUED)

Summary of Observations - DWO	
Observations	Rating
<p>DWO - 1. SUPERVISORY REVIEW OF WORK ORDERS WITHIN MAXIMO</p> <p>Based on our testing, we noted that many of the sampled work orders in CCCI (“Cross-Connection Control Inspection”), CM, FLSH (“Flush”), FLTST (“Flow Test”), INSP, INV (“Non-Emergency Investigation”), SHDEV (“Valve Shut for Developer”), SHSR (“Valve Shut for System Repair”), and SHRCH (“Main Recharge”) did not contain evidence of Trade Foreman (Supervisor) involvement or work documentation review and approval within Maximo.</p>	High
<p>DWO - 2. UTILIZATION OF MAXIMO</p> <p>Based on our testing of work orders, and discussion with Management and key process owners, we noted that DSO is not currently capturing all available cost data within Maximo. We identified the following:</p> <p><i>Costs not currently captured:</i></p> <ul style="list-style-type: none"> • Equipment usage and rental costs are not currently recognized. • Labor is recorded for crew lead’s time is captured per work order. Other crew member time is not recognized. • Vendor construction costs for some PSR work orders are not captured at the individual work order level. <p><i>Data entry inconsistencies:</i></p> <ul style="list-style-type: none"> • A majority of the sampled work orders in CCCI, CM, EM, FLSH, FLTST, INSP, INV, SHDEV, SHCIP (“Test Shut for CIP Work”), WQ (“Water Quality Issue”), SHSR, SHINV (“Valve Shut for Investigations”), and SHRCH had zero labor hours entered into Maximo. • Some of the sampled work orders in CM in which materials were likely utilized based upon work order details; there were zero materials costs entered into Maximo. 	High



EXECUTIVE SUMMARY (CONTINUED)

Summary of Observations	
Observations	Rating
<p>DWO - 3. MONITORING OF PERFORMANCE METRICS</p> <p>Based on our discussions with Management and key process owners, we noted that there is currently not a consistent, timely, and documented process for the recurring monitoring of high-level key performance metrics (although management does routinely review some limited and informal information).</p> <p>Examples of critical metrics identified and through discussions with management included the following:</p> <ul style="list-style-type: none"> • Work order scheduled date vs. actual complete date • Work order planned labor hours vs actual hours to complete • Labor / staffing utilization • Work order backlog, overall and by trade / specialty 	High
<p>DWO - 4. INCOMPLETE POLICIES AND PROCEDURES</p> <p>Based on our testing of work orders, we noted several instances of potential noncompliance with policies as a result of unclear requirements within established policies and procedures. For example:</p> <ul style="list-style-type: none"> • Work order documentation and data entry within the Maximo system. There is currently no established policy defining data entry requirements for each of the various work order types. • Work order review and approval, specifically supervisory review for all work order types, as well as operations review for CM work order types. 	Moderate

Process Improvement Opportunities have also been provided to Management for consideration.



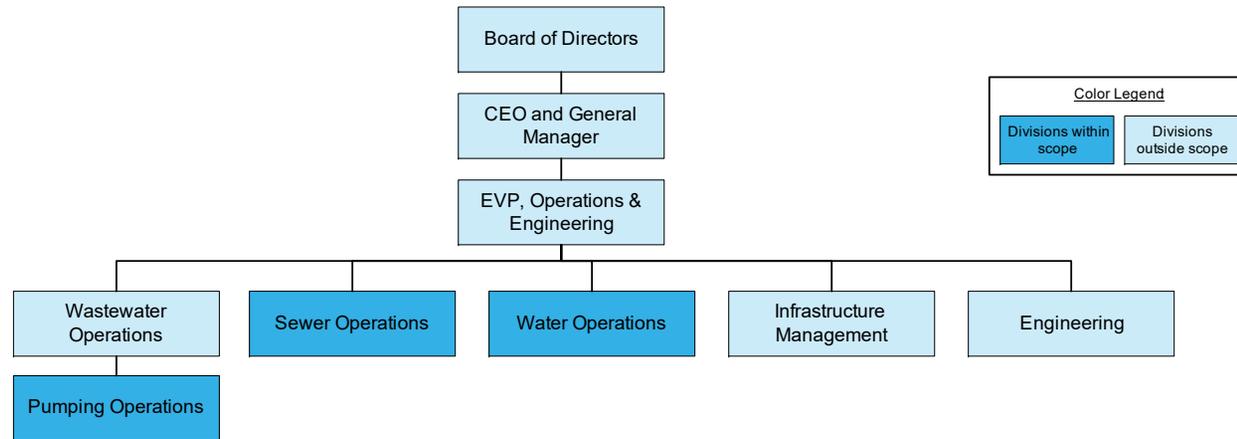
BACKGROUND, OBJECTIVES AND APPROACH

BACKGROUND

Organization Overview

Operations and Engineering divisions are responsible for the daily operations of DC Water’s infrastructure and assets, providing direct services to customers. These departments are the Authority’s first responders for emergencies impacting the customers and facilities overall. Pumping Operations (formerly DDCS), Sewer Operations, and Water Operations were within the scope of this review.

A high-level organizational chart of the Operations and Engineering divisions and the in-scope departments are illustrated below:



Below, financial data obtained from the Departmental Summary Approved Budget report shows the operating budget for each in-scope division:

Total Operations & Maintenance Budget (\$ in thousands)	FY 2015 Actual	FY 2016 Actual	FY 2017 Approved	FY 2018 Approved
Pumping Operations	45,543	45,304	50,075	48,490
Sewer Operations	13,978	14,944	15,077	14,315
Water Operations	21,974	23,449	22,936	24,094



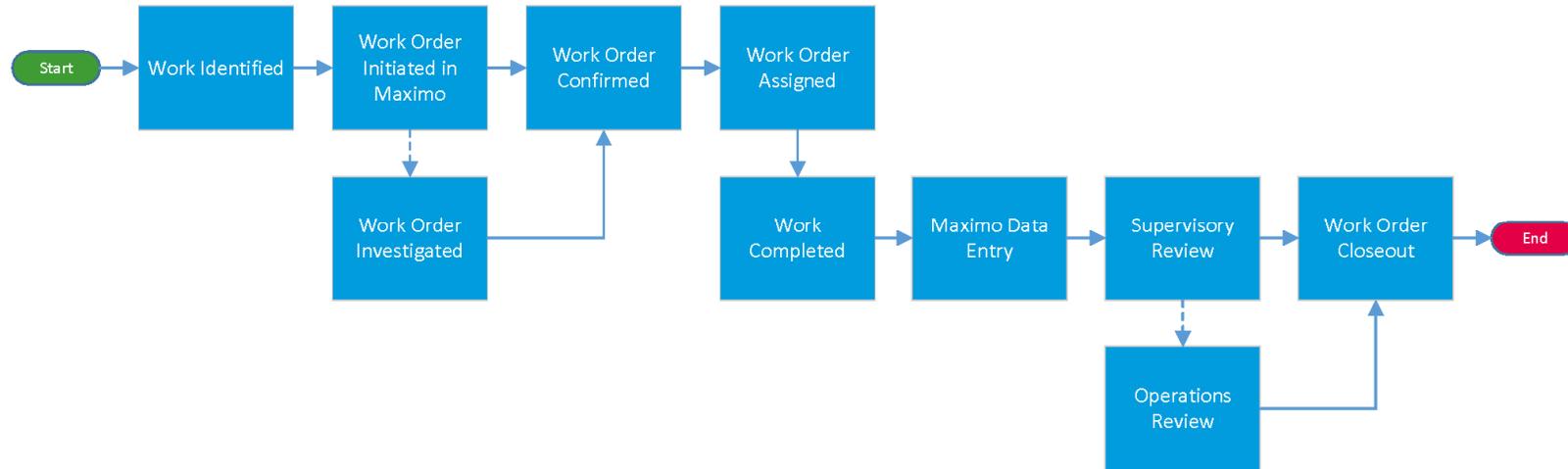
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BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

Organization Overview - continued

To facilitate the achievement of management’s objectives, Pumping Operations, Sewer Operations, and Water Operations implemented Maximo, a Computerized Maintenance Management System (CMMS). Maximo is a data management software that allows each department to share and enforce best practices, inventory, resources and personnel. This management tool allows departments to manage both planned and unplanned work activities, from initial request through completion and recording of actuals. The life cycle of the work order is captured within Maximo and allows management to properly analyze and track work order processes on a regular basis. The management software includes enhanced modules for asset tracking, service, contract, inventory, and procurement management.

The work order process is illustrated at a high-level below. Based upon the department and work order type, the work flow may have additional steps such as scheduling, material requisition, or vendor involvement. Additionally, some departments may not follow all of the steps identified below based upon business needs and/or resources.

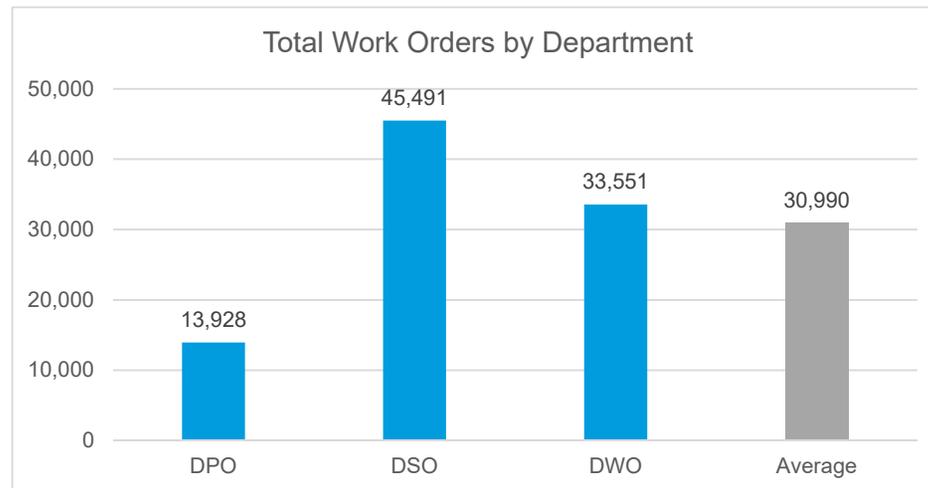




BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

Organization Overview - continued

Each of the three in-scope divisions utilizes Maximo to analyze the thousands of work orders that are generated across the Authority’s service areas. For each of the three divisions, a breakdown of work that took place in the timeframe of our scoping period between April 1, 2017 and March 31, 2018 is shown below. The totals below reflect all “completed” work orders for DSO and DWO, and all “closed” work orders for DPO (formerly DDCS). These statuses were confirmed as the final stage in the work order life cycle for the corresponding departments.



The chart below compares the number of positions within each division per the FY 2018 Approved Budget Departmental Summary report:

Number of Authorized Positions	FY 2015 Actual	FY 2016 Actual	FY 2017 Approved	FY 2018 Approved
Pumping Operations (DPO)	88	89	88	88
Sewer Operations (DSO)	119	116	119	115
Water Operations (DWO)	190	190	190	190

Further detail by department is presented on the following pages.





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BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

Organization Overview - continued

Utilization of Maximo across the divisions and branches is highlighted below.

Department	System Entries							Automation and Work Flow						Reporting			System Integration	
	Labor Hours / Cost	Materials Cost	Equipment Cost	Vendor Invoices	Asset Tagging	Prioritization	Final Work Order Status	Initiation Approval	Preventative Maintenance	Pre-Defined Job Plan	Work Order Planning	Work Order Assignment	Supervisor Review	Aging Report	Labor Utilization	Other KPI Monitoring	Inventory	Inventory to Accounting
DPO																		
Maintenance Branch	Y	P	N	Y	Y	Y	Closed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pumping Operations Branch	Y	P	N	Y	Y	Y	Closed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SCADA & Process Control Branch	Y	P	N	Y	Y	Y	Closed	Y	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y
Potomac Interceptor Branch	Y	N/A	N	N/A	Y	Y	Closed	Y	Y	Y	Y	Y	Y	N/A	Y	Y	N/A	N/A
DSO																		
Inspection & Maintenance Branch	P	N	N	N/A	P	P	Complete	Y	Y	Y	N/A	P	P	P	N	N	P	P
Construction & Repair Branch	Y	N	N	N/A	Y	Y	Complete	Y	Y	Y	N/A	Y	P	Y	N	N	P	P
DWO																		
Distribution Control Branch	P	P	P	N/A	Y	Y	Complete	Y	P	Y	N/A	Y	P	P	N	N	Y	Y
Distribution Maintenance Branch	P	N	N	N/A	N	Y	Closed	Y	N	Y	N/A	Y	Y	P	N	N	Y	Y
Construction Contract Management Branch	P	P	P	P	Y	Y	Complete	N/A	N	Y	N/A	Y	Y	P	N	N	P	N
Permit Operations¹	N	N/A	N/A	N/A	N	N	Paid	Y	N/A	N/A	N/A	N/A	Y	Y	N/A	Y	N/A	N/A
Department of Maintenance Services (DMS)¹	Y	P	N	N/A ²	Y	Y	Closed	P	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Legend

- Y** Yes - The function or attribute is fully utilized in Maximo
- P** Partial - The function or attribute is partially utilized in Maximo throughout the division
- N** No - The function or attribute is not utilized in Maximo
- N/A** The function or attribute is not applicable to the department

¹ Departments reviewed in prior audits
² Not included in original scope of work for initial audit



BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

Department of Pumping Operations (formerly DDCS)

The mission of the Department of Pumping Operations is *“to economically maintain DC Water’s process equipment and facilities at the Blue Plains Advanced Wastewater Treatment Plant, ensuring that the operational and customer service objectives of the Authority are achieved”.*

Per the FY 2018 Approved Budget Departmental Summary, DPO includes five main departmental branches:

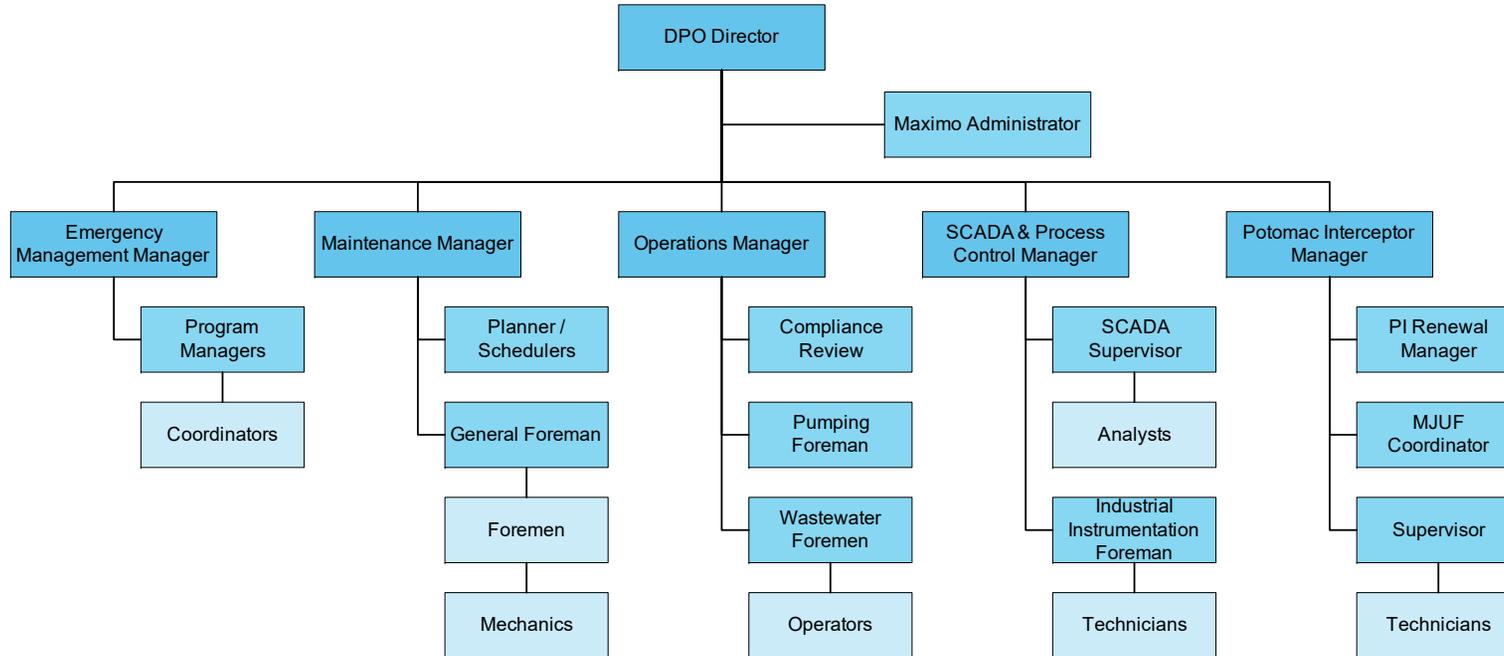
- The **Director’s Office & Emergency Management** within Pumping Operations retains primary responsibility for the following activities:
 - Manage the overall distribution and conveyance water and sewer system
 - Manage the Emergency Management Program
 - Manage the Vulnerability Assessment
 - Manage Emergency Preparedness training for DC Water staff and contractors
- The **Pumping Operations** team within DPO retains primary responsibility for the following activities:
 - Operate Water Pumping Stations, Storage Facilities and Water Towers
 - Operate Sanitary and Combined Sewer Facilities to ensure maximized flow to Blue Plains
 - Inspect inflatable dams to ensure proper function during rain events
 - Operate Northeast Boundary Swirl Facility
- The **SCADA Process Control** team within DPO retains primary responsibility for the following activities:
 - Operate and maintain SCADA Applications, Hardware and Network Support
 - Execute Storm Water Pollution Prevention Plan inspections and prepare reports
 - Operate and Maintain all Process Instrumentation and controls
 - Facilities, compile and administer Consent Decree reporting
- The **Maintenance** team within DPO retains primary responsibility for the following activities:
 - Plan, coordinate and perform all corrective, emergency, preventative, and predictive maintenance
 - Maintain and troubleshoot mechanical process systems and equipment
 - Plan, schedule, and perform condition monitoring for process equipment
 - Maintain/update Engineering Records
- The **Potomac Interceptor** team within DPO retains primary responsibility for the following activities:
 - Operate and maintain Potomac Interceptor (PI) Sewer
 - Operate and maintain PI Flow Meters and odor control facilities and manholes
 - Manage Miss Utility services in Virginia and Montgomery County, Maryland
 - Monitor Right-of-Way to maintain integrity and prevent encroachment



BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF PUMPING OPERATIONS (FORMERLY DDCS) - CONTINUED

The DPO organizational chart is illustrated below:



The financial data below, obtained from the FY 2018 Approved Budget Departmental Summary report, shows the division's headcount and operating budget:

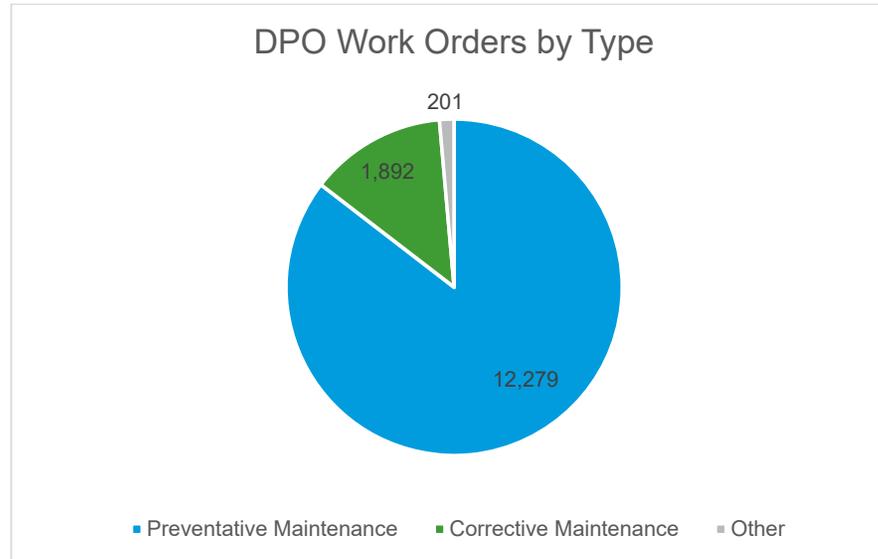
Statistic	FY 2015 Actual	FY 2016 Actual	FY 2017 Approved	FY 2018 Approved
Number of authorized positions	88	89	88	88
Average number of positions filled	66	75	-	-
Total Operations & Maintenance Budget (\$ in thousands)	45,543	45,304	50,075	48,490



BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF PUMPING OPERATIONS - CONTINUED

The following chart was derived directly from the work order data by management, and summarizes the breakout of work order types between the April 1, 2017 and March 31, 2018 timeframe.



Work order type "Other" includes INSP, SP, PD, PROJ, HKFM, SA, HKMT, OR and PA.

The following table was also derived directly from the work order data by management, and summarizes the average labor hours, labor costs, and material costs captured in the Maximo management system.

Work Type	Average Cost Per Work Order		
	Labor Hours	Labor Costs	Material Costs
Preventive Maintenance (PM)	0.93	\$ 52.85	\$ 0.10
Corrective Maintenance (CM)	14.00	\$ 672.17	\$ 190.97
Other	15.54	\$ 580.69	\$ 154.11

BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF SEWER OPERATIONS

The mission of the Department of Sewer Operations (DSO) is *“to collect and convey sewage to the Blue Plains Wastewater Plant efficiently and effectively, as well as collect and discharge storm water to rivers, streams and other bodies of water to prevent localized flooding.”*

Per the FY 2018 Approved Budget Departmental Summary, DSO involves two main branches:

- The **Inspection & Maintenance** team within Sewer Operations retains primary responsibility for the following activities:
 - Inspect public sewers and sewer laterals. Clean sewers and inlet/outlet structures. Operate and maintain sewer regulator structures
 - Remove floatable debris
 - Monitor & Control Operations
- The **Construction & Repair** team within DSO retains primary responsibility for the following activities:
 - Install and repair sewer mains and sewer laterals
 - Install and repair catch basins
 - Cleaning and maintenance operations of regular catch basins, stormceptors, and grate ponds
 - Oversee maintenance program for storm water structures, filter bio-retention and water quality catch basin cleaning

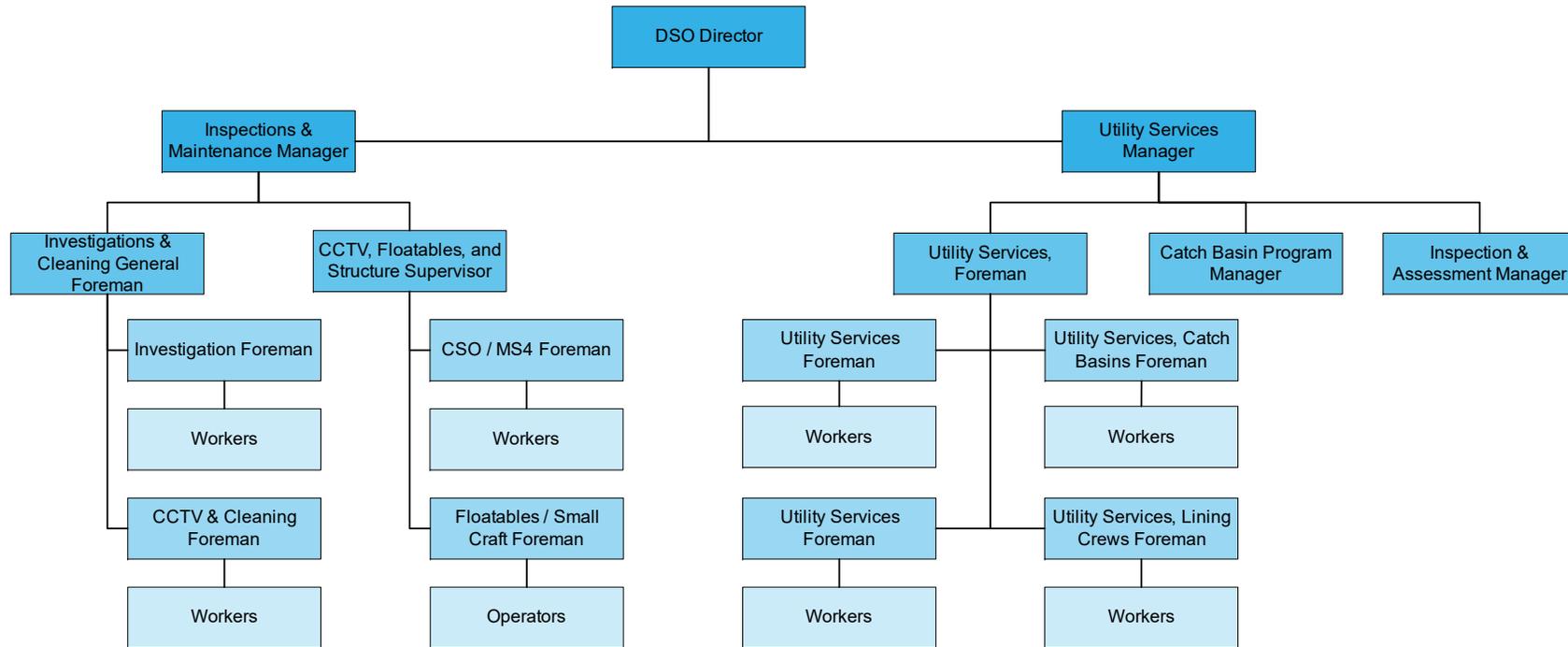


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BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF SEWER OPERATIONS - CONTINUED

The DSO organizational chart is illustrated below:



The financial data below, obtained from the FY 2018 Approved Budget Departmental Summary report, shows the division's headcount and operating budget:

Statistic	FY 2015 Actual	FY 2016 Actual	FY 2017 Approved	FY 2018 Approved
Number of authorized positions	119	116	119	115
Average number of positions filled	108	105	-	-
Total Operations & Maintenance Budget (\$ in thousands)	13,978	14,944	15,077	14,315

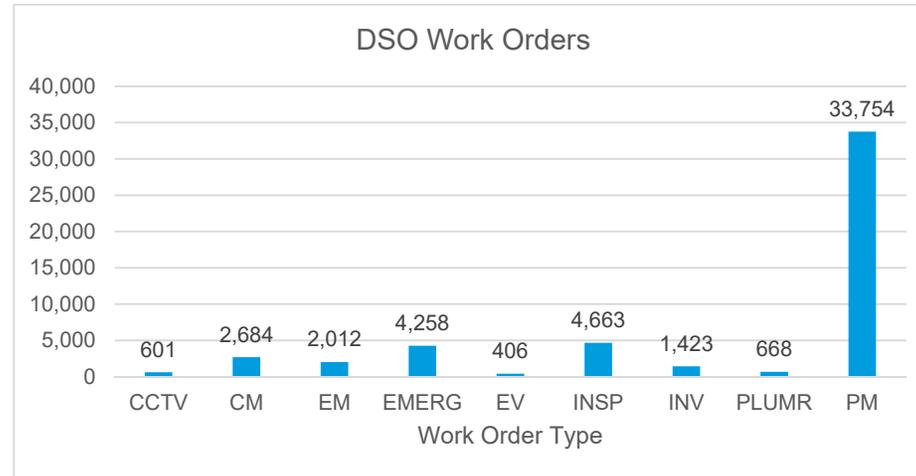




BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF SEWER OPERATIONS - CONTINUED

The following chart was derived directly from the work order data by management, and summarizes the breakout of work order types between the April 1, 2017 and March 31, 2018 timeframe.



The following table was also derived directly from the work order data by management, and summarizes the average labor hours, labor costs, and material costs captured in the Maximo management system.

Work Type	Average Cost Per Work Order		
	Labor Hours	Labor Costs	Material Costs
Preventive Maintenance (PM)	0.40	\$ 16.33	\$ 0
Inspection (INSP)	0.16	\$ 6.60	\$ 0
Emergency (EMERG)	2.02	\$ 75.19	\$ 0
Corrective Maintenance (CM)	1.27	\$ 50.41	\$ 0
Emergency Maintenance (EM)	6.05	\$ 247.56	\$ 0
Investigation (INV)	1.77	\$ 67.11	\$ 0
Plumber's Report (PLUMR)	0	\$ 0	\$ 0
Public Sewer Main Inspection (CCTV)	0.84	\$ 35.02	\$ 0
Event (EV)	0.01	\$ 0.55	\$ 0

BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF WATER OPERATIONS

The mission of the Department of Water Operations (DWO) is *“to operate and maintain a potable water distribution system, which delivers safe drinking water to DC Water’s customers. Water Operations will ensure that water distribution meets or exceeds the applicable water quality regulations promulgated by the Safe Drinking Water Act and is provided in a reliable manner.”*

Per the FY 2018 Approved Budget Departmental Summary, DWO involves four main branches:

- The **Distribution Maintenance** team within DWO retains primary responsibility for the following activities:
 - Repair and replace water main services lines, valves and hydrants
 - Lead Leak Detection efforts and Tap abandonment for the Authority
 - Manage fire hydrant contracts and respond to all fire hydrant inquiries
 - Support departmental safety efforts and assist in investigations as first responder during emergencies
- The **Distribution Control** team within DWO retains primary responsibility for the following activities:
 - Inspect, exercise and perform preventative maintenance on 40,000 system valves and 9,500 fire hydrants
 - Administer the Flushing Program and perform minor valve leak repairs
 - Manage the Valve Coordination Control program and test valve shutdown plans for CIP construction projects
- The **Contract Management** team within DWO retains primary responsibility for the following activities:
 - Establish and administer a comprehensive asset management program for both water and sewer systems
 - Administer Public Space Restoration Program and associated contracts
 - Manage and direct Operating and CIP budgets, including construction projects inspections
- The **Linear Asset Management** team within DWO retains primary responsibility for the following activities:
 - Provide detail data management related to process improvement and long-range financial planning
 - Manage linear assets in the Water Distribution and Sewer Collection systems
 - Manage optimization and prioritization of the capital program projects
 - Enhancing service life of assets while lowering the number of lifecycle maintenance and reducing cost

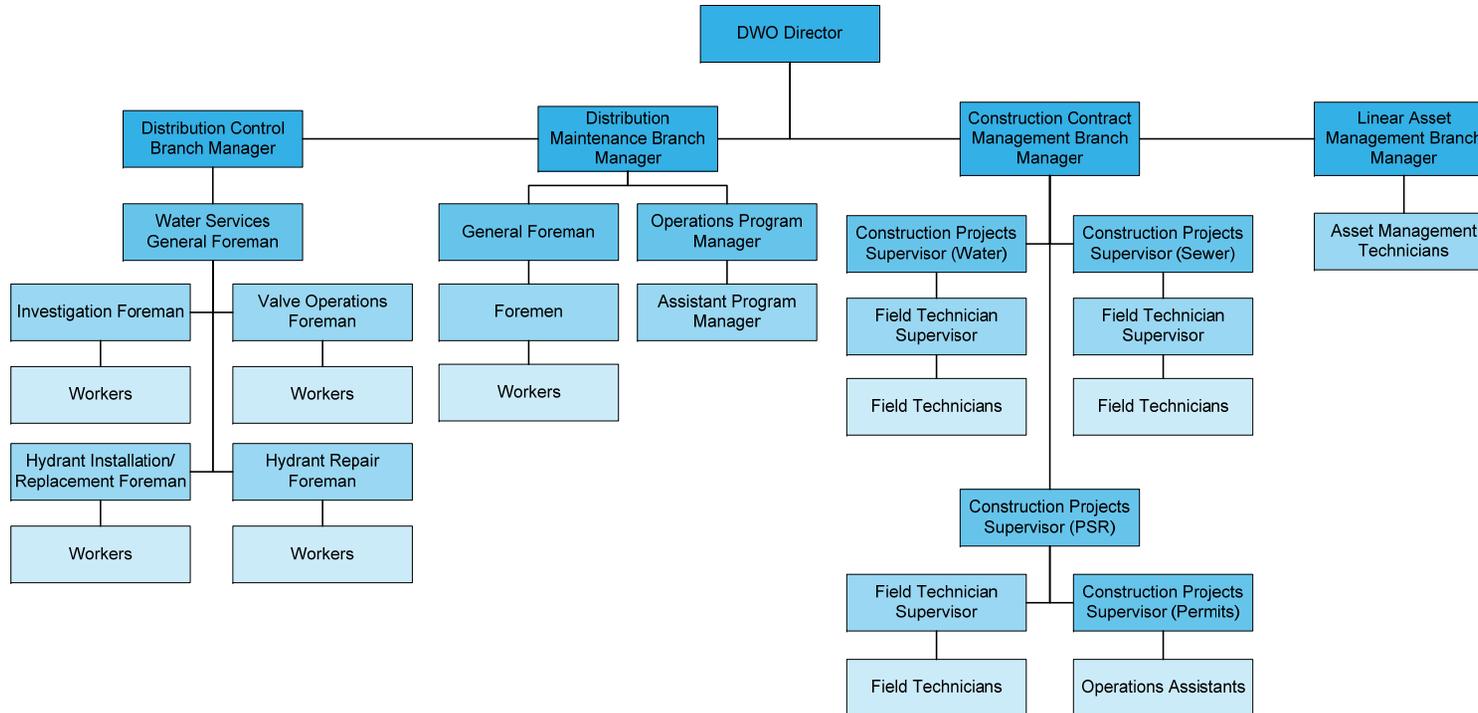


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BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF WATER OPERATIONS - CONTINUED

The DWO organizational chart is illustrated below:



The financial data below, obtained from the FY 2018 Approved Budget Departmental Summary report, shows the division's headcount and operating budget:

Statistic	FY 2015 Actual	FY 2016 Actual	FY 2017 Approved	FY 2018 Approved
Number of authorized positions	190	190	190	190
Average number of positions filled	163	168	-	-
Total Operations & Maintenance Budget (\$ in thousands)	21,974	23,449	22,936	24,094

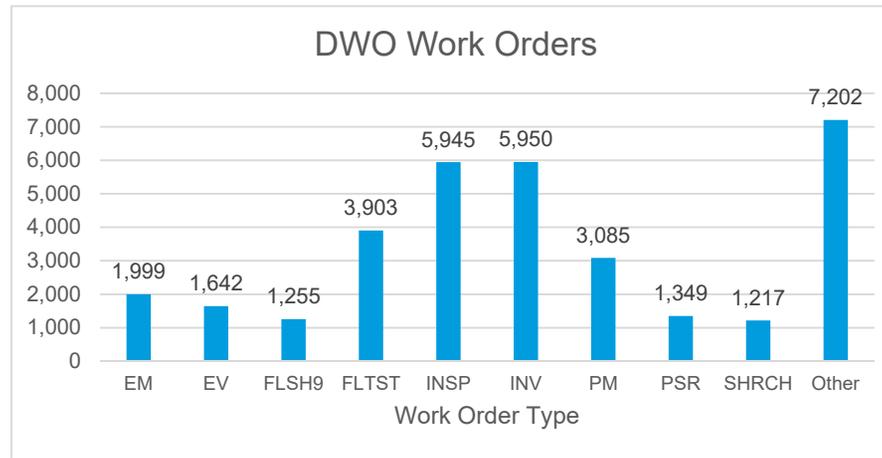




BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

DEPARTMENT OF WATER OPERATIONS - CONTINUED

The following chart was derived directly from the work order data by management, and summarizes the breakout of work order types between the April 1, 2017 and March 31, 2018 timeframe.



Work order type "Other" includes 30 additional work order types such as CCCI, CM, SHDEV, SHSR, FLSH, SHCIP and WQ.

The following table was also derived directly from the work order data by management, and summarizes the average labor hours, labor costs, material costs, and service cost captured in the Maximo management system.

Work Type	Average Cost Per Work Order		
	Labor Hours	Labor Costs	Material Costs
Investigation (INV)	0.004	\$ 0.13	\$ 0
Inspection (INSP)	0.002	\$ 0.08	\$ 0
Flush Test (FLTST)	0.002	\$ 0.08	\$ 0
Preventive Maintenance (PM)	0.28	\$ 11.22	\$ 0
Emergency Maintenance (EM)	0.01	\$ 0.37	\$ 188.07
Event (EV)	0.006	\$ 0.23	\$ 0
Public Space Restoration (PSR)	0	\$ 0	\$ 0
Planned Spot Flushing (FLSH9)	0	\$ 0	\$ 0
Main Recharge (SHRCH)	0	\$ 0	\$ 0
Other	0.06	\$ 2.49	\$ 1,030.54

BACKGROUND, OBJECTIVES AND APPROACH (CONTINUED)

OBJECTIVES AND APPROACH

The internal audit of the Authority's Integrated Work Order Management function was performed in accordance with the internal audit scope and approach set forth in our audit notification letter, dated April 4, 2018, and were limited to the procedures described therein:

Obtaining an Understanding

The first phase of our review consisted primarily of inquiry in an effort to obtain an understanding of the Authority's structure and key processes within our scope. The following procedures were conducted as part of the first phase of our review:

- Conducted interviews with key personnel to obtain a detailed understanding of the Authority's policies and procedures, operating functions, and key performance indicators for the following areas:
 - Work order initiation and screening
 - Work planning and scheduling
 - Work execution and data entry
 - Work order closeout
 - Reporting and monitoring
- Reviewed documented policies and procedures, organizational charts, and any other key process information available to further our understanding of the function.
- From our interviews and review of policies, we identified key risks and controls, and developed a detailed control testing script to facilitate phase 2 testing.

Detailed Testing

The second phase of our review consisted of an assessment of the design of key controls, and testing of the operating effectiveness of those controls. This process was facilitated through the testing of a sample of work orders closed by the Department of Sewer Operations, the Department of Water Operations, and the Department of Pumping Operations during the period of 4/1/2017 – 3/31/2018. Our procedures during this phase included, but not were not limited to:

- From the population of closed or completed work orders, we selected a sample of sixty (60) work orders from each of the three Departments from the Maximo Computerized Maintenance Management System (CMMS)
- For each work order selected, we requested and reviewed relevant supporting documentation in an effort to determine the operating effectiveness of controls within the Authority's work order function. Key areas of focus included:
 - Labor hours / costs
 - Inventory costs
 - Equipment costs
 - Subcontractor costs

Reporting

At the conclusion of this internal audit, we summarized our observations related to the Integrated Work Order Management function and reviewed the results of our testing with management.



DETAILED OBSERVATIONS

Work Order Management Internal Audit			
DPO – 1.	<u>Inconsistent Use and Non-Compliance of Approved Established Work Flow</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based upon discussions with process owners and review of the <i>Work Management Process Flowchart</i>, we noted that DPO utilizes an established work flow within the Maximo system, which institutes baseline requirements for work order approval, work documentation, review and subsequent completion and close out.</p> <p>Based on our testing of work orders, we noted the following:</p> <ul style="list-style-type: none"> • 5 of 60 sampled work orders (4/34 PM and 1/1 PD) did not utilize the established work flow within Maximo. • 7 of 24 non-PM (6/23 CM, 1/1 PROJ) work orders tested did not utilize the Planner/Scheduler function per the work order status history prior distributing the work order to a DPO worker. • 5 of 60 work orders tested (0/23 CM, 5/34 PM and 0/1 PROJ) contained no evidence of Trade Foreman work documentation review and approval. <p style="text-align: center;">(continued)</p>	<p>We recommend that DPO work with Maximo to implement safeguards within the software to require that work orders follow the established work flow without deviation.</p> <p>This will help maintain consistency in the work flow which will lead to more accurate and timely recording of cost / effort data related to the maintenance of assets. Accurate tracking of this information is critical to the ongoing asset management initiative.</p> <p>Additionally, we recommend DPO provide training to all supervisors and technicians regarding current policies and procedures pertaining to the work order lifecycle and data entry into Maximo.</p>	<p>Response:</p> <ol style="list-style-type: none"> 1. DPO has taken a proactive step of resending its Work management SOP to its entire staff. DPO will continue to harp on the importance of ensuring that its workorder records were processed in a timely fashion and per laid down procedures and policies. <p>Target Date: Complete</p> <ol style="list-style-type: none"> 2. All DPO personnel have been trained on Maximo best practices. <p>Target Date: Complete</p> <ol style="list-style-type: none"> 3. DPO will develop QAQC (“Quality Assurance Quality Control”) report that will identify workorders were stalled on a status over an acceptable period or do not have all the identified required fields. <p>Responsible Party: DPO Management Team, Maximo Administrator</p> <p>Target Date: January 2019</p> <ol style="list-style-type: none"> 4. DPO is currently working with IT to resolve all the issues that hinders the routing of PM workorders through the existing workflow process. <p>Responsible Party: IT</p> <p>Target Date: January 11, 2019</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DPO – 1.	<u>Inconsistent Use and Non-Compliance of Approved Established Work Flow</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p style="text-align: center;">(continued)</p> <p>The Maximo workflow, as defined, is designed to: (a) prevent unnecessary work orders and increase efficient identification of root causes, (b) document planned hours and pre-order materials for efficiency, and (c) provide for documented supervisory and operations review and approval of work completed.</p> <p>By not utilizing the established work flow for all work orders, unnecessary work may be completed, work orders may be closed without capturing proper / accurate documentation or relevant data, or work orders may be closed without appropriate work completed.</p>		



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DPO – 2.	<u>Utilization of Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: Moderate		
	<p>Based on our testing of work orders, and discussion with Management and key process owners, we noted that each department is not currently capturing all available cost data within Maximo.</p> <p>The only costs currently captured include technician labor hours, and inventory that is ordered / maintained through Materials Management. Costs related to equipment usage (owned) or rental costs, as well as fleet vehicle use is not applied to individual work orders. The following costs items are not currently entered in Maximo:</p> <ul style="list-style-type: none"> • Equipment usage and rental costs • Planner / Scheduler labor <p>By not tracking the costs noted above, DPO is unable to identify the true total cost of performing work orders, and therefore unable to assess the actual total cost of maintaining each asset. This limits management’s ability to monitor trends, assess performance, and identify areas of concern for further investigation.</p>	<p>We recommend DPO provide training to all personnel involved in work order data entry in regards to current policies and procedures pertaining to the work order lifecycle and data entry into Maximo.</p> <p>Additionally, we recommend Management consider expanding the usage of Maximo to capture all practicable costs, including equipment usage, rental costs, and Planner/Scheduler labor.</p> <p>Capturing this additional data will assist DPO by providing more detailed information for use in developing KPIs, and will assist the Authority in capturing all relevant costs for use in tracking true lifetime costs at the individual asset level.</p>	<p>Response:</p> <ol style="list-style-type: none"> 1. DPO will continue to circulate Maximo required fields and responsibility Matrix to its personnel. 2. DPO had developed and deployed a weekly QAQC report that identifies workorders with zero labor hours. The report is emailed to all DPO supervisors on Monday mornings. <p>Target Date: Complete</p> <p>Target Date: Complete</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 1.	<u>Inconsistent Supervisory Review of Work Orders within Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based on discussions with Management and key process owners, we noted that all corrective maintenance (CM) work orders are required to be reviewed by an appropriate Trade Foreman (supervisor) to confirm completeness and accuracy of data input into Maximo. Although supervisory review is the expectation within DSO, there is currently no department policy or procedure defining this requirement for all work orders. This lack of a defined policy causes inconsistent application of supervisory review (also refer to <i>DSO-4</i>).</p> <p>During our testing, we reviewed the work order status history of 60 completed DSO work orders and identified the following:</p> <ul style="list-style-type: none"> 4 of 60 sampled work orders (1/4 CCTV, 1/6 EM, and 2/13 EMERG) did not contain evidence of Trade Foreman (supervisor) work documentation review and approval within Maximo. <p>Additionally, we noted that currently there is no requirement of operational review for CM work orders prior to putting an asset back into service.</p> <p style="text-align: center;">(continued)</p>	<p>We recommend DSO work with Maximo to update existing workflows within the software to require supervisory review and approval for all completed work orders, as well as an operational review for CM work orders. The ability to perform this approval should be restricted to only the Trade Foreman and Management, and should not include Technicians/Mechanics or other personnel below the Foreman level.</p> <p>In conjunction with updating the policies and procedures to reflect current practice (see <i>DSO-4</i>), we recommend DSO provide training to all supervisors and technicians regarding current policies and procedures related to review requirements in the work order life cycle.</p>	<p>Response: Currently, in the preliminary phase, DSO is creating Maximo work flow processes for all sections. The new work flow process is created to eliminate causes that lead to inconsistent application of supervisory review. DSO will also implement Maximo Basic Skill Level Training, which is currently in the scheduling and course preparation phase. The final deliverable will also include a document detailing work order management procedures and protocols.</p> <p>Responsible Party: LaShema Burrell (Linear Asset Management)</p> <p>Target Date: Work Flows: IT Development Phase January 1, 2019 Work Order Management Procedure January, 1 2019 Maximo Training: January 1, 2019</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 1.	<u>Inconsistent Supervisory Review of Work Orders within Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>(continued)</p> <p>Without required or documented review by supervisors, work orders may contain incorrect data, including labor hours, materials, and/or notes. This increases the risk of undetected error or misappropriation of Authority assets.</p> <p>Further, review by operations personnel is critical to verify that appropriate work has been completed to remediate the interruption of operations, prior to returning the asset to active status.</p>		



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 2.	<u>Utilization of Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based on our testing of work orders, and discussion with Management and key process owners, we noted that each department is not currently capturing all available cost data within Maximo.</p> <p>Additionally, costs that are expected to be captured, such as labor hours, are not always input appropriately into the Maximo system. We identified the following inconsistencies in data entry:</p> <ul style="list-style-type: none"> For 9 out of 60 sampled work orders (2/4 CCTV, 3/6 EM and 4/13 EMERG) there were zero labor hours entered into Maximo when labor hours should have been captured based upon work order description and notes. <p>Additionally, we noted the following:</p> <ul style="list-style-type: none"> Labor is recorded for crew lead's time per work order; however, other crew member time is not recognized. Materials are typically purchased in bulk on an open PO or administrative work order. Materials management work flow is utilized; however, individual work orders do not recognize material costs. <p style="text-align: center;">(continued)</p>	<p>We recommend Management provide training to all personnel involved in work order data entry to current policies and procedures pertaining to the work order lifecycle and data entry into Maximo.</p> <p>Additionally, we recommend Management consider expanding the usage of Maximo to capture all practicable costs.</p> <p>Capturing this additional data will assist DSO by providing more detailed information for use in developing KPIs, and will also assist the Authority in capturing all relevant costs for use in tracking true lifetime costs at the individual asset level.</p>	<p>Response: DSO is in communication with the IT, Maximo and Lawson teams, who are aware of DSO needs related to not adding material cost to individual work orders.</p> <p>Issues that have led to users being unable to enter complete labor hours to work orders have been addressed on an as-needed basis when Foremen are made aware by crew leads and during the work order review process; however, newly created work flows as identified in the response to Observation #1 will eliminate this issue going forward.</p> <p>Responsible Party: Joshua Mazurek (IT, Maximo) and Scott Perry (Procurement)</p> <p>Target Date: February 1, 2019</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 2.	<u>Utilization of Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>(continued)</p> <p>By not tracking the costs noted above, or inconsistently capturing labor and materials costs, DSO is unable to capture the true total cost of performing work orders, and therefore unable to assess the actual total cost of maintaining each asset. This limits management’s ability to monitor trends, assess performance, and identify areas of concern for further investigation.</p>		



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 3.	<u>Monitoring of Performance Metrics</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based on our discussions with Management and key process owners, we noted that currently there is not a consistent, timely, and documented process for the recurring monitoring of high-level key performance metrics. While management noted that limited and informal information is routinely monitored (such as outstanding work orders, and total CCTV feet cleaned / inspected), additional monitoring of key metrics related to departmental work order management does not occur.</p> <p>Examples of critical metrics monitored by leading practice organizations include the following:</p> <ul style="list-style-type: none"> • Work order scheduled date vs. actual complete date • Work order planned labor hours vs actual hours to complete • Labor / staffing utilization • Work order backlog, overall and by branch / work type <p>Consistent, timely, and documented review of metrics is essential to give management the ability to identify trends, assess performance and progress against goals, and identify areas requiring more in-depth review.</p>	<p>We recommend Management continue to develop and expand monitoring efforts and “Key Performance Indicators” (KPIs), and implement a formal consistent, timely and documented process for monitoring the defined metrics. KPIs should be selected with the objectives of monitoring trends, assessing performance, and identifying areas of concern, etc. The selected metrics and evidence of management’s review should be documented in a recurring (e.g. monthly/quarterly) report for ease of review.</p>	<p>Response: DSO currently monitors various KPIs such as (eg. CM 60+ days elapsed, EM 90+ days elapsed, etc.) which are reviewed on a timely basis by appropriate personnel. In conjunction with the existing KPI monitoring process, we will revise to streamline and align with best in class operations to coincide with the Authority’s vision and priorities going forward.</p> <p>Responsible Party: DSO Branch Managers (Sigi Sharp, Dunbar Regis) DSO General Foremen (Kevin Jhingory and Anthony Richards)</p> <p>Target Date: Weekly, Beginning January 1, 2019</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 4.	<u>Policies and Procedures</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: Moderate		
	<p>Based on our testing of work orders we noted several instances of potential noncompliance with policies as a result of undocumented requirements within established policies and procedures. For example:</p> <ul style="list-style-type: none"> • Policies and procedures relevant to the DSO Work Order Management process do not define requirements specific to PM or CM work orders. The current <i>Sewer Emergency Investigations Workflow</i> flowchart utilized to document work flow requirements only includes the requirements specific to emergency investigations. • Policies and procedures do not clearly define the work order data required to be entered into the Maximo system. Within the <i>Sewer Emergency Investigations Workflow</i> flowchart, a note is included which states “additional tasks include completion of the following in Maximo: Actual Tab, Log Tab, Failure Code and Asset Tag”. Based upon discussion with DSO management, the expectation is for appropriate data to be entered for all work orders, however these expectations are not clearly defined within this note or elsewhere within the flowchart. <p style="text-align: center;">(continued)</p>	<p>We recommend that DSO update or amend policies to clearly delineate between requirements specific to emergency investigation versus requirements specific to PM and CM work orders. This will provide staff with a current, clearly defined, listing of requirements and expectations for work performed. Additionally, the data will be entered and tracked in Maximo with consistency, which will allow for more efficient, reliable, and comparable data for use in tracking metrics over multiple periods.</p> <p>All exceptions to the established workflow should either be documented in an approved exceptions listing, or documented in each work order.</p>	<p>Response: Failure Codes, actual labor hours, and log descriptions specific to the work order type (emergency investigation, PM and CM) will all become mandatory fields prior to work order completion. All of these requirements will be included within the work flow flowchart that maintains the Standard Operating Procedure for DSO work orders.</p> <p>Responsible Party: LaShema Burrell (Linear Asset Management)</p> <p>Target Date: December 1, 2018</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DSO – 4.	<u>Policies and Procedures</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: Moderate		
	<p style="text-align: center;">(continued)</p> <p>Without current, up-to-date policies and procedures, staff may not understand all requirements and expectations applicable to the work they are performing. As such, this may lead to inconsistent application of policies, which will affect the accuracy and reliability of data reported from the Maximo system. Consistent treatment and entry of data when originally collected is critical to obtaining consistent historical data for reporting and monitoring.</p> <p>Further, the workflow through Maximo of work orders is designed to: (a) prevent unnecessary work orders and increase efficient identification of root causes, (b) document planned hours and pre-order materials for efficiency, and (c) provide for documented supervisory and operations review and approval of work completed. By not following the policies and procedures as written, or by not updating policies and procedures to accurately reflect current practice, unnecessary work may be completed, or work orders may be closed without proper work completed.</p>		



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 1.	<u>Inconsistent Supervisory Review of Work Orders within Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based on discussions with Management and key process owners, we noted that all corrective maintenance (CM) work orders are required to be reviewed by an appropriate Trade Foreman (supervisor) to confirm completeness and accuracy of data input into Maximo. Although supervisory review is the expectation within DWO, there is currently no department policy or procedure defining this requirement for all work orders. This lack of a defined policy causes inconsistent application of supervisory review (also refer to <i>DWO-4</i>).</p> <p>During our testing, we reviewed the work order status history of 60 completed DWO work orders and identified the following:</p> <ul style="list-style-type: none"> 30 of 60 sampled work orders (1/2 CCCI, 2/2 CM, 4/5 FLSH, 2/8 FLTST, 8/11 INSP, 9/11 INV, 1/1 SHDEV, 1/1 SHSR, and 2/2 SHRCH) did not contain evidence of Trade Foreman (supervisor) involvement or work documentation review and approval within Maximo. <p>Additionally, we noted that currently there is no requirement of operational review for CM work orders prior to putting an asset back into service.</p> <p style="text-align: center;">(continued)</p>	<p>We recommend DWO work with Maximo to update existing workflows within the software to require supervisory review and approval for all completed work orders, as well as an operational review for CM work orders. The ability to perform this approval should be restricted to only the Trade Foreman and Management, and should not include Technicians/Mechanics or other personnel below the Foreman level.</p> <p>In conjunction with updating the policies and procedures to reflect current practice (see <i>DWO-4</i>), we recommend DWO provide training to all supervisors and technicians regarding current policies and procedures related to review requirements in the work order life cycle.</p>	<p>Response: DWO recently implemented the use of "Field Complete" status in some of the business processes to allow the field work associated with an activity to be completed while the management team reviews the data captured. We will continue to expand the current use of "Field Complete" status to allow staff to complete field work portion of the process while allowing the management team an opportunity to review and updated the work order accordingly prior to changing the status to "Complete." This expanded use of work order status will be evaluated across all work activities and implemented where deemed appropriate and supported by the business processes in place. Associated documentation and training will be provided to all impacted staff.</p> <p>Responsible Party: Manager, Linear Asset Management will serve as the lead for this activity on behalf of DWO and the IT lead will be identified later.</p> <p>Target Date: End of FY2020 (contingent on completion of asset data load by end of FY2018)</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 1.	<u>Inconsistent Supervisory Review of Work Orders within Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p style="text-align: center;">(continued)</p> <p>Without required or documented review by supervisors, work orders may contain incorrect data, including labor hours, materials, and/or notes. This increases the risk of undetected error or misappropriation of Authority assets.</p> <p>Further, review by operations personnel is critical to verify that appropriate work has been completed to remediate the interruption of operations, prior to returning the asset to active status.</p>		



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 2.	<u>Utilization of Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based on our testing of work orders, and discussion with Management and key process owners, we noted that DWO is not currently capturing all available cost data within Maximo. Some costs are captured in other programs or reports which do not integrate with Maximo.</p> <p>Additionally, labor and material costs that are expected to be captured are not always input appropriately into the Maximo system. Specifically, we identified the following inconsistencies in data entry:</p> <ul style="list-style-type: none"> 50 of 60 sampled work orders (2/2 CCCI, 2/2 CM, 4/4 EM, 5/5 FLSH, 8/8 FLTST, 11/11 INSP, 11/11 INV, 1/1 SHDEV, 1/1 SHCIP, 1/1 WQ, 1/1 SHSR, 1/1 SHINV, and 2/2 SHRCH) contained zero labor hours entered into Maximo when work order description and notes indicated that labor costs were incurred to perform the work. 2 of 6 sampled work orders (2/2 CM and 0/4 EM) contained zero materials costs when work order description and notes indicated that material costs were incurred to perform the work. <p style="text-align: center;">(continued)</p>	<p>We recommend DWO build out the labor costing capabilities within Maximo to utilize the actual start and stop times that are consistently entered into the system. Utilizing already defined crew labor rates, labor costing can be captured upon entry of the work order start and stop time.</p> <p>We also recommend for Management to provide training to all personnel involved in work order data entry to current policies and procedures pertaining to the work order lifecycle and data entry into Maximo.</p> <p>Additionally, we recommend Management consider expanding the usage of Maximo to capture all practicable costs.</p> <p>Capturing this additional data will assist DWO by providing more detailed information for use in developing KPIs, and will also assist the Authority in capturing all relevant costs for use in tracking true lifetime costs at the individual asset level.</p>	<p>Response: Pending completion of the asset data load into Maximo, we will select teams for participation in a pilot program focusing on labor and materials entry into Maximo. Upon completion of the asset data load and pilot program, we will re-evaluate Maximo cost tracking across all work activities and implement where appropriate and supported by the business processes.</p> <p>The decision to invest time, energy, and resources into the expanding the current use and capabilities of Maximo to capture these costs will be made alongside the Finance Department and IT as they continue to evaluate the appropriate tools required to assist the authority in providing tools to better capture and analyze cost across multiple platforms. As discussed during this evaluation, it is our expectation that this effort will also include the completion of the linear asset data load effort currently underway that will assist our department in capturing all work related costs at the asset level.</p> <p>Responsible Party: Department of Water Operations Management Team, Information Technology, and Finance The Manager, Linear Asset Management will serve as the lead for this activity on behalf of DWO and the IT lead will be identified later.</p> <p>Target Date: Pilot program targeted for end of FY2020 (contingent upon completion of the asset data load by the end of FY2018)</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 2.	<u>Utilization of Maximo</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>(continued)</p> <p>Additionally, we noted the following:</p> <ul style="list-style-type: none"> • Equipment usage and rental costs are not currently recognized. • Labor is recorded for crew lead's time per work order; however, other crew member time is not recognized. • Vendor construction costs for some PSR work orders are not captured at the individual work order level. <p>By not tracking the costs noted above, or inconsistently capturing labor and materials costs, the Authority is unable to identify the true total cost of performing work orders, and therefore unable to assess the actual total cost of maintaining each asset. This limits management's ability to monitor trends, assess performance, and identify areas of concern for further investigation.</p>		



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 3.	<u>Monitoring of Performance Metrics</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: High		
	<p>Based on our discussions with Management and key process owners, we noted that there is currently not a consistent, timely, and documented process for the recurring monitoring of high-level key performance metrics. While management noted that limited information is routinely monitored (such as 90+ day work order backlog), additional monitoring of key metrics related to departmental work order management does not occur.</p> <p>Examples of critical metrics monitored by leading practice organizations include the following:</p> <ul style="list-style-type: none"> • Work order scheduled date vs. actual complete date • Work order planned labor hours vs actual hours to complete • Labor / staffing utilization • Work order backlog, overall and by branch / work type <p>Consistent, timely, and documented review of metrics is essential to give management the ability to identify trends, assess performance and progress against goals, and identify areas requiring more in-depth review</p>	<p>We recommend Management further refine monitoring efforts to include development of “Key Performance Indicators” (KPIs), and implement a formal consistent, timely and documented process for monitoring the defined metrics. These KPIs should be selected with the objectives of monitoring trends, assessing performance, and identifying areas of concern, etc. The selected metrics and evidence of management’s review should be documented in a recurring (e.g. monthly/quarterly) report for ease of review.</p>	<p>Response: We will review all submitted indicators and revise to streamline and align with best in class operations to coincide with the authority’s vision and priorities going forward.</p> <p>Responsible Party: Manager, Linear Asset Management</p> <p>Target Date: End of FY2020</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 4.	<u>Policies and Procedures</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: Moderate		
	<p>Based on our testing of work orders we noted several instances of noncompliance with departmental expectations and current practices as a result of undocumented requirements / policies and procedures specific to the following:</p> <ul style="list-style-type: none"> • Work order documentation and data entry within the Maximo system. There is currently no established policy defining data entry requirements for each of the various work order types. • Work order review and approval, specifically supervisory review for all work order types, as well as operations review for CM work order types. <p>Without current, up-to-date policies and procedures, staff may not understand all requirements and expectations applicable to the work they are performing. As such, this may lead to inconsistent application of policies, which will affect the accuracy and reliability of data reported from the Maximo system. Consistent treatment and entry of data when originally collected is critical to obtaining consistent historical data for reporting and monitoring.</p> <p style="text-align: center;">(continued)</p>	<p>We recommend that DWO document policies to clearly define work order management requirements, including work order documentation, data entry into Maximo, and required levels of review and approval, as well as other key requirements identified by management. This will provide staff with a current, clearly defined, listing of requirements and expectations for work performed. Additionally, the data will be entered and tracked in Maximo with consistency, which will allow for more efficient, reliable, and comparable data for use in tracking metrics over multiple periods.</p> <p>All exceptions to the established workflow should either be documented in an approved exceptions listing, or documented in each work order</p>	<p>Response: We will work to document work order management expectations, policies, and procedures in line with system of record requirements for all operational staff and activities. We would like to see that this effort is aligned with other areas and departments that utilize the same or similar systems of record to ensure that similar activities within the agency are following similar policies and procedures. This additional step to help to minimize silo-type activities and potential streamline support as needed from group to group.</p> <p>Responsible Party: Manager, Linear Asset Management</p> <p>Target Date: End of FY2019</p>



DETAILED OBSERVATIONS (CONTINUED)

Work Order Management Internal Audit			
DWO – 4.	<u>Policies and Procedures</u>	<u>Recommendation</u>	<u>Management’s Action Plan</u>
	Observation Rating: Moderate		
	<p style="text-align: center;">(continued)</p> <p>Further, the workflow through Maximo of work orders is designed to: (a) prevent unnecessary work orders and increase efficient identification of root causes, (b) document planned hours and pre-order materials for efficiency, and (c) provide for documented supervisory and operations review and approval of work completed. By not following the policies and procedures as written, or by not updating policies and procedures to accurately reflect current practice, unnecessary work may be completed, or work orders may be closed without proper work completed.</p>		



PROCESS IMPROVEMENT OPPORTUNITY

Work Order Management Internal Audit

Asset Tag Number Upload

Each work order identifies assets based upon name, description and location; however, specific asset tag numbers are currently being uploaded into Maximo to provide a unique identifier for all linear assets. In the current state, Management is unable to obtain a work order history for individual assets to determine maintenance performed over the asset life, as well as related cumulative costs. We recommend the Authority continue with the current effort of uploading asset tag numbers for all linear assets to help better analyze work orders and associated costs at the individual asset level.



APPENDIX A – RATING DEFINITIONS

Observation Risk Rating Definitions	
Rating	Definition
Low	Observation presents a low risk (i.e., impact on financial statements, internal control environment or business operations) to the organization for the topic reviewed and/or is of low importance to business success/achievement of goals. Action should be taken within 12 months (if related to external financial reporting, must mitigate financial risk within two months unless otherwise agreed upon).
Moderate	Observation presents a moderate risk (i.e., impact on financial statements, internal control environment or business operations) to the organization for the topic reviewed and/or is of moderate importance to business success/achievement of goals. Action should be taken within nine months (if related to external financial reporting, must mitigate financial risk within two months).
High	Observation presents a high risk (i.e., impact on financial statements, internal control environment or business operations) to the organization for the topic reviewed and/or is of high importance to business success/achievement of goals. Action should be taken immediately, but in no case should implementation exceed six months (if related to external financial reporting, must mitigate financial risk within two months).



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