



# **Detroit Water and Sewerage Department Wastewater Operations Group**

## **Asset Management Program Implementation Annual Report**

**For the Period July 1, 2014 to June 30, 2015**

**October 1, 2015**

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## Background

In accordance with the provisions established in Part I, Section 12(c) (2) of NPDES permit no. MI 0022802, DWSD is required, to submit an annual report by October 1 covering implementation of the Asset Management Program during the prior fiscal year. This report is the second such submittal and covers the fiscal year July 1, 2014 – June 30, 2015.

### CMMS Platform

On June 1, 2014, the Oracle Work and Asset Management (WAM) application replaced EMPAC as the DWSD Computerized Maintenance Management System (CMMS). WAM, as its name implies, offers extensive Asset Management capabilities in addition to its CMMS (Work Management) capabilities.

WAM's initial configuration efforts focused primarily on replicating EMPAC's Work Management functions, but (beginning in January, 2015) the focus shifted to both expanding WAM's Work Management functionality and tapping its full Asset Management potential. WAM's asset management capabilities will eventually be developed to deliver, or support, all the Asset Management Program items listed in the NPDES permit. That development/configuration process is underway and following a path that sometimes parallels (but sometimes lags) the addressing of some of the items specified in the NPDES permit. To be sure, WAM will be configured to provide all the capabilities required for:

- *A comprehensive fixed asset inventory that is maintained, managed, and updated within a computerized maintenance management system (CMMS)*
- *A comprehensive inventory of the collection system fixed assets and collection system map*

Rather than wait until Department-wide consensus is reached on the WAM configuration changes required to address or support all NPDES permit Asset Management items (expected by mid-2016), we have addressed some items using the Water Environment Research Foundation's (WERF's) Excel-based tools, with the goal of mapping and transferring the data to WAM as configuration changes are made.

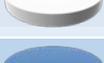
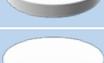
## AM Program Requirements and Initiatives

Part I, Section 12(c) (1) of NPDES permit no. MI 0022802 requires the implementation of an asset management (AM) program that addresses the Asset Management Program elements specified in the permit. These elements are listed in the left hand column of Table 1. To achieve the elements, DWSD developed a list of Initiatives (identified in the DWSD Asset Management Program of December 2013). The initiatives are listed in the table’s middle column. For clarity, details have been extracted from some initiatives (particularly those that include implementation for the 355 critical WWTP assets) and new initiatives have been added (primarily those involving the development of WAM’s capabilities). The table’s right-hand column provides a visual indicator of progress in realizing each initiative.

Table 1: DWSD AM Initiatives that Fulfil MDEQ Permit AM Program Requirements

MDEQ Permit AM Program Elements	DWSD AM Initiatives	% Complete
<b>Comprehensive fixed asset inventory that is maintained, managed, and updated within a CMMS</b>	1.02.01.A – Define asset registers structures & asset ID protocols	
	1.02.01.A <i>NEW</i> – Reorganize WWTP/CSO asset hierarchy in WAM	
	3.0 – Audit WWTP/CSO asset & MMI <sup>1</sup> data	
<b>Comprehensive inventory of collection system fixed assets and collection system map</b>	1.02.01.A <i>NEW</i> – Reorganize Collection Sys asset hierarchy in WAM	
	1.02.01.A <i>NEW</i> – Collect & map Collection Sys GIS data to WAM	
	3.0 – Collect Collection Sys asset & MMI <sup>1</sup> data	
<b>Preventive Maintenance Program that may include predictive and reliability centred maintenance</b>	1.04.01.A – Develop RCM asset evaluation program	
	1.04.01.A <i>NEW</i> - Develop WAM FMEA asset evaluation program	
	1.04.01.A <i>DETAIL</i> - Develop RCM-based PMs for critical WWTP Assets	
	1.04.01.B – Develop Preventive Maintenance Optimization (PMO) program	
<b>Needs Assessment updated at least every 3 years – to include condition assessment and service level review</b>	1.02.03 – Define condition, performance & reliability assessment protocols	
	1.02.03 <i>NEW</i> -Configure WAM for condition assessments	
	1.12.02.C – Define protocols for using the Asset Renewal Valuation tool	
	1.12.02.C <i>DETAIL</i> -Forecast renewal dates for 355 critical WWTP assets	
	1.12.02.C <i>NEW</i> -Configure WAM for renewal forecasting	
	1.01.04 – Define minimum required Level of Service at the asset level	
	1.04.06 – Develop processes for producing annual asset management plans	

<sup>1</sup> MMI – Maintenance Managed Item

MDEQ Permit AM Program Elements	DWSD AM Initiatives	% Complete
<b>Criticality assessment and risk management</b>	1.03.02 – Define asset effective and remaining useful lives	
	1.03.02 <i>DETAIL</i> -Determine remaining useful life of 355 critical WWTP assets	
	1.03.02 <i>NEW</i> -Configure WAM for determining remaining useful life	
	1.03.06 – Define asset Business Risk Exposure (BRE)	
	1.03.06 <i>DETAIL</i> -Determine BRE for 355 critical WWTP assets	
	1.03.06 <i>NEW</i> -Configure WAM for accepting BRE data	
<b>Capital planning process</b>	1.12.02.C – Define protocols for using the Asset Renewal Valuation tool	
	1.12.02.C <i>DETAIL</i> -Forecast renewal dates for 355 critical WWTP assets	
	1.12.02.C <i>NEW</i> -Configure WAM for renewal forecasting	
	1.12.02.B – Define protocols for conducting Business Case Evaluations (BCEs)	
<b>Scheduled Replacement Program (SRP) for assets</b>	1.12.02.C – Define protocols for Using the Asset Renewal Valuation tool	
	1.04.06 – Develop processes for producing annual asset management plans	
<b>Monitoring and periodic performance evaluation using KPIs</b>	1.02.03 – Define condition, performance & reliability assessment protocols	
	1.02.03 <i>NEW</i> -Configure WAM for condition assessments	
	1.01.04 – Define minimum required Level of Service at the asset level	
	1.04.06 – Develop processes for producing annual asset management plans	
<b>Management oversight of system performance</b>	1.04.06 – Develop processes for producing annual asset management plans	
	1.12.02.A – Develop asset management process diagrams and procedure	

### AM Initiatives Implementation Update

Progress has been made on many of the Initiative tasks, including newly-added tasks that were not part of the 2013 Program. Most of the newly-added tasks revolve around re-configuring WAM to provide the all asset management tools (like Condition Assessments and Streamlined RCM analyses) in a single, comprehensive platform...then developing the templates and procedures to use those WAM tools.

The progress updates that follow are organized by the original Program’s Initiatives. For each Initiative, we are providing:

- A “PERMIT RELATED” suffix to the title of each initiative that was designated as an “Initiative that relates specifically to the AM program elements as specified in the MDEQ Permit” in the 2013 Program, Appendix C, page C-1.
- An OVERVIEW, taken from the 2013 Program, for each initiative.
- A BACKGROUND section providing information about the Asset Management function being served by the initiative.
- A PREPARATORY WORK section showing progress made in accomplishing the preparatory work needed (defining protocols, developing SOPs) before implementing the process(es) included in initiative.
- An IMPLEMENTATION section showing progress made in implementing the process(es) included in the initiative
- A STEPS/TASKS section showing the steps required to accomplish the initiative and the status of each step.

**Initiative 1.01.04: Define Minimum Required Level of Service at the Asset Level – PERMIT RELATED**

**OVERVIEW**

*This initiative will define an asset minimum required level of service scoring scale (e.g. customer response time, permit compliance, odor levels, service reliability, etc.), and define protocols for evaluating and scoring assets to assign minimum required level of service ratings at the asset level.*

**BACKGROUND**

Assets exist to deliver services and goods that are valued by the customer/stakeholder; for each consumer/stakeholder there is a minimum level of service below which a given service is not perceived as adding value.

Levels of Service (LoS) can be defined as those characteristics or attributes of a product or service that describe its required minimum level of performance. These characteristics typically describe about the service such characteristics as how much, of what nature, and how frequently the service will be delivered. Levels of Service should generally align with overall organizational strategic goals and support the organization's business drivers.

**PREPARATORY WORK**

Work on this initiative has not yet begun, but will begin in the third quarter of 2016.

**IMPLEMENTATION**

Work on this initiative has not yet begun, but will begin in the third quarter of 2016.

**STEPS/TASKS**

- Develop an SOP that defines a scoring scale for asset minimum required level of service (MRLoS) ratings, defines protocols for determining MRLoS ratings for different asset classes, and defines protocols for conducting QC reviews – NOT STARTED
- Develop templates as needed to support data collection – NOT STARTED
- Evaluate and score assets to assign MRLoS ratings – NOT STARTED

**Initiative 1.02.01. A: Define Asset Registers Structures and Asset Identification Protocols – PERMIT RELATED****OVERVIEW**

*This initiative will define the structures of the asset registers for various asset groups (e.g. plants, pump/booster stations, basins, linear assets, etc.); including the level of detail or granularity necessary to represent lowest level maintenance managed items within the registers. In addition, standardized identification protocols will be defined.*

**BACKGROUND**

Implementing a well thought out and well-constructed asset hierarchy is one of the most important steps in building an effective asset management program. Such a hierarchy provides structure/organization to the asset registry. The asset registry itself is the fundamental building block for asset management. In the registry, each asset is assigned a unique ID that links the asset to all its related data records (bill of materials, specifications, work history, condition assessments, FMEAs, etc.). A registry organized in a hierarchical structure allows analysis of both individual assets and groups of assets.

A hierarchical asset requires establishing registry is organized much like a family tree. At the lowest level is a child. Above that is a parent, then grandparent, then great-grandparent, etc., with each level encompassing more and more asset records, until reaching the top of the hierarchy: DWSD.

**PREPARATORY WORK**

In preparation for bifurcation of the DWSD's assets into GLWA and DWSD-Retail, the financial hierarchy was restructured. That required the mapping and migration of all WWTP, CSO and sewage pumping station assets to a completely new set of cost centers within WAM. The mapping of assets (by the OAM) and the data migration (by the IT group) was completed in June, 2015.

Working with divisions throughout the Department, the OAM created the Asset Hierarchy Strategy Document in March 2015. The Document **defines the hierarchical structure of the asset registers** and the rules that govern the placement of assets within that structure.

The GIS mapping of collection system assets, and the transferring of asset attributes (size, materials, installation dates, etc.) from paper maps, is being done by EMA and Metco. The asset hierarchy for the collection system and linking to WAM will be accomplished as part of this work. It is expected to take 3 to 5 years with a completion goal of 2020.

The **asset identification protocol** was standardized in April, 2015. Existing asset IDs will remain unchanged and all new assets will have system-generated IDs assigned.

**IMPLEMENTATION**

The OAM is now collecting all the WWTP, CSO and sewage pumping station assets (vertical assets) currently in WAM; verifying their new cost centers; and creating the new system level (parent) assets needed to implement the hierarchical registers defined by the Asset Hierarchy Strategy Document. The asset hierarchy data collection and asset register re-structuring will be completed and ready for uploading to WAM in August, 2015. The uploading and testing in WAM (to be done by the IT group), is expected to be completed in September, 2015.

**STEPS/TASKS**

- Complete the asset hierarchy data collection and asset register re-structuring in August, 2015 – IN PROGRESS
- Upload and test the hierarchy and asset registers (by the IT group) in September, 2015 – NOT STARTED

**Initiative 1.02.01.B: Link Preventative Maintenance Rules & Activities to MMIs****OVERVIEW**

*This initiative will link preventive maintenance rules and future work history to the maintenance managed items (MMIs) identified within asset registers (as appropriate).*

**BACKGROUND**

The subdivision of existing assets into MMIs (separating a pumping unit asset into pump, motor and drive assets, for example) is a low priority task and will be undertaken sometime in 2019. In the interim, PM procedures will continue to be linked to the assets as they currently exist.

**PREPARATORY WORK**

Work on this initiative has not yet begun.

**IMPLEMENTATION**

Work on this initiative has not yet begun.

**STEPS/TASKS**

- TBD

**Initiative 1.02.02: Define Attribute Information to be Collected for Assets & MMIs – PERMIT RELATED****OVERVIEW**

*This initiative will define the standards for attribute information to be collected for assets and maintenance managed items identified in asset registers.*

**BACKGROUND**

All assets should have a standard, baseline set of attributes that include manufacturer data, location data and depreciation data; but also include CMMS-specific codes that group assets into types, classes and processes. Additional attributes (specifications and PM procedures, for example) apply to specific asset classes or types.

**PREPARATORY WORK**

The OAM has designated 44 standard, baseline asset attributes (see Table 2) and mapped them to data fields within WAM. *Several of those fields still require WAM re-configuration to enable more of WAM's asset management capabilities (for example: Asset Class codes need to be established to enable Condition Assessments and FMEAs).*

The OAM has developed the baseline asset attribute data collection template and associated SOP. Implementation will follow WAM re-configuration in November, 2015.

**IMPLEMENTATION**

Implementation expected in December, 2015.

**STEPS/TASKS**

- Identify baseline asset attributes – COMPLETED
- Develop attribute collection templates, mapped to WAM data fields - COMPLETED
- **NEW-Complete the development of attribute codes and WAM configuration by December, 2015 – IN PROGRESS**
- Collect missing or currently non-existent attribute data for WWTP and CSO assets and upload to WAM by June, 2018 – NOT STARTED

Table 2: Baseline Asset Attributes

Form	Attribute	Asset 1	Asset 2	Asset 3
Asset Header Data	Asset ID			
	Criticality			
	Status			
	Description			
	FMEA System			
	Parent Asset			
	Asset Type			
	Process			
	Asset Class			
	Specification			
	Asset Class Type			
	BOM ID			
Location Data	Basis			
	Point ID			
	Building			
	Room			
	Location			
	Position			
	Breaker Panel			
	Breaker			
	Breaker Asset ID			
	Latitude			
Longitude				
Manufacturer Data (View)	Serial No.			
	Manufacturer			
	Part No.			
	Drawing No.			
	Order No.			
	Model No.			
	Revision			
Depreciation (View)	Property Unit No.			
	Account No.			
	Useful Life			
	Units			
	Method (Depreciation)			
	Acquisition Reading			
	Acquisition Cost			
	Acquisition Date			
	Salvage Value			
	In Service Date			
	Replacement Value			
	Retirement Date			
	Number of Units			
Group Rate				

**Initiative 1.02.03: Define Asset Condition, Performance, and Reliability Assessment Protocols – PERMIT RELATED****OVERVIEW**

*This initiative will define scoring scales for asset condition, performance, and reliability, and define protocols for conducting assessments and scoring assets to assign condition, performance, and reliability ratings for assets/maintenance managed items.*

**BACKGROUND**

Assessing the condition, performance and reliability of an asset is an integral step in determining the remaining useful life of an asset, and in determining the likelihood of the asset's failure. Condition, performance and reliability assessment scores are used in the development of an effective Asset Management Plan, a Capital Investment Program (CIP), and Operations and Maintenance programs. Regular condition, performance and reliability monitoring will allow maintenance and renewal strategies to be updated and refined more accurately.

**PREPARATORY WORK**

The Condition, Performance and Reliability scoring scales and protocols were defined within WERF's Asset Renewal & Valuation Forecasting (ARVF) tool. The scoring scales and protocols were completed in January 2015.

A SOP was developed that describes the use of the ARVF tool to assign asset condition/performance/reliability ratings based on Subject Matter Expert (SME) input. This task was completed in January 2015.

The OAM developed WAM-based Condition, Performance and Reliability scoring scales (based on the WERF-based scales) for implementation after further WAM reconfiguration.

The OAM held a series of workshops leading to the adoption of Department-wide Component, Failure and Repair codes, expected to be uploaded to WAM in August, 2015. These codes will provide historical data upon which to base data-driven asset reliability scoring within WAM.

Job aids have been developed and training in using those codes when finishing work orders will be delivered following code uploading to WAM.

**IMPLEMENTATION**

Condition, performance and reliability ratings of the 355 most critical WWTP assets were developed within WERF's ARVF tool. The task was completed in March 2015.

**STEPS/TASKS**

- Define Condition, Performance and Reliability scoring scales – COMPLETED
- Develop SOP - COMPLETED
- NEW-Develop codes and reconfigure WAM to enable Condition and Performance Assessments – IN PROGRESS
- NEW-Develop WAM-based Condition and Performance Assessment templates – NOT STARTED
- Complete the condition, performance and reliability ratings for the remaining WWTP and CSO assets by December, 2016 – NOT STARTED

**Initiative 1.03.02: Define Asset Effective and Remaining Useful Lives – PERMIT RELATED****OVERVIEW**

*This initiative will define typical asset effective life for broad high level asset classes, and how remaining asset useful life is determined to support renewal/replacement forecasting.*

**BACKGROUND**

To assess the likelihood of an asset's failure, a practical determination must be made of that asset's remaining useful life. The factors that determine remaining useful life include the asset's installation date; the expected life of that class of asset; and the asset's condition, performance and reliability ratings. Knowing an asset's remaining useful life, and the lead time needed to effect a re-investment strategy (repair, refurbish or replace), allows more effective CIP planning.

**PREPARATORY WORK**

Expected life tables were developed for asset classes within the WERF ARVF tool in September 2014. Asset effective life was defined, using the expected life tables in combination with the WERF-based condition/performance/reliability ratings defined under Initiative 1.02.03.

An SOP was developed, based on WERF's ARVF tool, for assessing asset remaining useful life. This task was completed in April 2015.

The OAM has obtained asset installation dates and the expected lives of WWTP and CSO asset classes from Finance and has begun mapping that data to WAM data fields.

**IMPLEMENTATION**

Remaining useful life assessments of the 355 critical WWTP assets was accomplished using WERF's ARVF tool. The assessments of the critical WWTP assets was completed in March 2015.

**STEPS/TASKS**

- Develop expected life table – COMPLETED
- Assess remaining useful life of 355 critical WWTP assets - COMPLETED
- Assess remaining useful life of the rest of the WWTP and CSO assets, using the WERF ARVF tool, in 2016 – NOT STARTED
- NEW-Reconfigure WAM and develop data collection templates as noted in Initiative 1.02.03 – IN PROGRESS
- NEW-Enter asset installation date; the expected life of that class of asset; and the asset's condition, performance and reliability ratings into WAM – NOT STARTED
- NEW-Procure and configure an AM modelling tool (like RIVA) to analyze data entered/accumulated within WAM – NOT STARTED

**Initiative 1.03.06: Define Asset Business Risk Exposure – PERMIT RELATED****OVERVIEW**

*This initiative will define an asset consequence of failure scoring scale, and how asset business risk exposure is determined to support prioritization of asset related activities and decisions .*

**BACKGROUND**

Assessing Business Risk Exposure (BRE) is a method of scoring the level of risk we face through a potential failure of an asset or group of assets. Business Risk Exposure is derived by assessing both likelihood that a potential asset failure may actually occur; and the consequence of that failure.

BRE scoring helps prioritize the assets for which remedial action should be taken, beginning with assets that have both a high Likelihood of Failure (LoF) and a high Consequence of Failure (CoF).

**PREPARATORY WORK**

Consequence and Likelihood of Failure rating scales were defined within the WERF Business Risk Evaluation (BRE) tool and an SOP for conducting a BRE, using WERF's tool, was drafted in August, 2014.

**IMPLEMENTATION**

Business Risk Evaluations were conducted for the most critical WWTP assets in September 2014 and a resulting Tolerable Risk Map was generated.

**STEPS/TASKS**

- Develop SOP for assigning LoF and CoF ratings and determining BRE - COMPLETED
- Conduct BRE assessments for 355 critical WWTP assets - COMPLETED
- Conduct BRE assessments for the remaining WWTP and CSO assets in 2016 – NOT STARTED
- **NEW-Create a user defined field and configure WAM to store BRE data – NOT STARTED**

**Initiative 1.04.01.A: Develop Reliability Centered Maintenance Asset Evaluation Program – PERMIT RELATED****OVERVIEW**

*This initiative will develop protocols for conducting asset reliability centered evaluations in order to determine expected failure modes and appropriate detection and/or mitigation maintenance tactics.*

**BACKGROUND**

Reliability-centered maintenance (RCM) evaluations identify potential failures that might occur in any part of a system to determine the probable effect of each failure on all other parts of the system or on other systems. It is used to determine asset-specific maintenance tactics based on the operating context and environment of the asset. It promotes optimizing asset maintenance tactics based on a defined evaluative process rather than staff intuition and manufacturer recommendations.

Although DWSD's Preventive Maintenance Plan calls for Streamlined Reliability Centered Maintenance (SRCM) evaluations for critical assets, DWSD wanted to make sure that such approach is appropriate and effective. Hence, DWSD conducted full RCM2 analyses for two critical assets: Intermediate Lift Pumps (conducted in June-July 2014) and Belt Filter Presses (conducted -in July-August 2014). DWSD found that, for the remaining critical assets, conducting SRCM was as effective, more expeditious, and required far fewer resources.

**PREPARATORY WORK**

The data to be used in Streamlined Reliability Centered Maintenance analyses was collected, Excel templates were created to capture and analyze the data, and training in their use for conducting SRCM analyses was held in November, 2014.

The OAM developed a template to collect similar data for uploading to WAM's Failure Mode and Effect Analysis (FMEA) module. That module, after WAM re-configuration, will replace the SRCM evaluation tool for future analyses.

As noted under Initiative 1.02.03, the OAM has also developed WAM-based Condition, Performance and Reliability scoring scales for use in WAM's FMEA module.

As noted under Initiative 1.02.03, the OAM led the effort to adopt Department-wide Failure and Repair codes, expected to be implemented in WAM in August, 2015. In addition to providing data for analysis, these codes will also be used in the FMEA module.

**IMPLEMENTATION**

Two critical assets underwent full RCM2 evaluations between June and August, 2014.

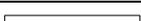
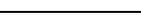
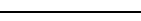
The remaining critical WWTP assets underwent SRCM evaluations between August, 2014 and March, 2015.

The SRCM analyses for the 355 critical assets (grouped into 24 cohorts) had identified 1427 discrete tasks to be performed. These tasks were bundled into 328 separate PM procedures. Of those, 40% have been drafted and have undergone Subject Matter Expert review process. (Reference Table 3).

**STEPS/TASKS**

- Develop SOP for conducting SRCM analyses – COMPLETED
- Conduct SRCM analyses for 355 critical WWTP assets - COMPLETED
- Complete drafting the remaining PM procedures for critical WWTP assets by March, 2016 – IN PROGRESS
- Conduct quality control audits on all PM procedures before uploading into WAM – NOT STARTED
- Upload those procedures into WAM by October, 2016 – NOT STARTED
- NEW-Develop key asset codes and configure WAM for implementation of the FMEA module by December, 2015 – IN PROGRESS

Table 3: PM Procedure Development Progress

Critical Assets	SRCM Tasks	Bundled PM	Drafted PM	% Complete
Transformers and Bus Ducts	44	10	3	
Sludge Thickeners	82	14	10	
Main Lift Pumps	46	20	20	
Screened Final Effluent Pumps	17	5		
Sludge Storage Tanks	24	9	9	
Boilers	42	5		
Incinerators	196	84	12	
Central Offload Facility	36	11		
Gates and Dams	24	6		
Cake Pumps	136	8		
Chlorination/De-chlorination	19	13	13	
Ash Silos	39	9	2	
Waste Activated Sludge Pumps	8	3		
Filter Feed Pumps	17	6		
Centrifuges	30	6	6	
Secondary Clarifiers	50	18	18	
Aeration Basins	87	8	8	
Central Air Compressors	60	16	6	
Vacuum Pumps	24	7	6	
Screw Conveyors	31	12	4	
Primary Sedimentation Tanks	49	6	6	
Belt Conveyors	41	10	5	
Belt Filter Presses	200	19	3	
Intermediate Lift Pumps	125	23		
<b>TOTALS</b>	<b>1427</b>	<b>328</b>	<b>131</b>	

**Initiative 1.04.01.B: Develop Preventive Maintenance Optimization Program – PERMIT RELATED****OVERVIEW**

*This initiative will develop protocols for conducting asset preventive maintenance optimization evaluations in order to evaluate the appropriateness of existing preventive maintenance tactics for assets that are not subjected to reliability centered maintenance evaluations.*

**BACKGROUND**

Work on this initiative has not yet begun.

**PREPARATORY WORK**

Work on this initiative has not yet begun.

**IMPLEMENTATION**

Work on this initiative has not yet begun.

**STEPS/TASKS**

- TBD

**Initiative 1.04.04: Develop Asset Life Cycle Costs Management Processes****OVERVIEW**

*This initiative will develop protocols for capturing and periodically reviewing asset life cycle costs.*

**BACKGROUND**

Life-cycle cost analysis is a method for assessing the total cost of asset ownership. It takes into account all costs of acquiring, owning, and disposing of an asset or system of assets. LCCA is especially useful when competing alternatives that fulfill the same performance requirements, but differ in initial and operating costs, have to be compared in order to select the one that maximizes net savings.

This initiative has a relatively low priority and will be likely be implemented in 2018.

**PREPARATORY WORK**

The protocols for identifying and capturing Life Cycle Costs, and periodically reviewing them to support renewal/replacement decisions, are incorporated in WERF's Life Cycle Cost Projection (LCCP) tool.

An SOP for conducting Life Cycle Cost Projections, using the templates contained in WERF's LCCP tool, was drafted in May, 2015 and incorporates the protocols described above.

**IMPLEMENTATION**

Implementation of this initiative has not yet begun.

**STEPS/TASKS**

- Define Life Cycle Cost protocols – COMPLETED
- Develop SOP for projecting Life Cycle Costs – COMPLETED
- Implement Life Cycle Cost Analysis as part of the CIP planning process – NOT STARTED

**Initiative 1.04.06: Develop Processes for Producing Annual Asset Management Plans – PERMIT RELATED****OVERVIEW**

*This initiative will define the processes for producing annual asset management plans from a strategic perspective.*

**BACKGROUND**

An Asset Management Plan is a long-range planning document that provides a rational framework for understanding DWSD assets, the present and future service demands on those assets, the capital and operational financial resources needed to maintain service provided by those assets, the strategies and programs needed for long term provision of services, and the links between strategic business objectives and the services the assets deliver.

**PREPARATORY WORK**

The SOP defining the protocols for producing annual asset management plans was drafted in April, 2015.

**IMPLEMENTATION**

The 1<sup>st</sup> Annual Asset Management Plan will be produced following completion of all other initiatives.

**STEPS/TASKS**

- Develop SOP for producing annual asset management plans - COMPLETED
- Implement the other initiatives – IN PROGRESS
- Collect complete and accurate data to strengthen planning and decision making – IN PROGRESS

**Initiative 1.06.01: Develop Policy for Organization-wide Business Risk Management****OVERVIEW**

*This initiative will define the policy for evaluating and managing business risk exposure from a strategic perspective and on a broad organization-wide basis.*

**BACKGROUND**

Work on this initiative has not yet begun.

**PREPARATORY WORK**

Work on this initiative has not yet begun.

**IMPLEMENTATION**

Work on this initiative has not yet begun.

**STEPS/TASKS**

- TBD

**Initiative 1.07.01.A: Define Protocols for Asset Acquisition, Commissioning, and Turnover****OVERVIEW**

*This initiative will define protocols for managing asset acquisition, commissioning, and turnover practices to facilitate more timely and accurate tracking of assets within the asset management program.*

**BACKGROUND**

A process for ensuring that all baseline attributes for newly acquired assets is entered in the asset database is essential. Defining the data to be collected and the parties responsible for collecting it should be part of every new project.

**PREPARATORY WORK**

An SOP was developed in February, 2015, and defines the protocols for collecting required data for new assets before turnover.

A section was drafted for incorporation into the DWSD master specifications that includes a data collection template and the scheduled procedure for providing the asset data to DWSD. It is under review prior to its inclusion in the Master Specifications.

**IMPLEMENTATION**

Implementation has not yet begun.

**STEPS/TASKS**

- Develop the SOP for collecting new asset data – COMPLETED
- Develop the section for inclusion in the DWSD Master Specification-DRAFTED
- Incorporate the asset acquisition, commissioning and turnover section in the Master Specifications – IN PROGRESS

**Initiative 1.07.01.B: Refine and Re-implement Records Management Policy****OVERVIEW**

*This initiative will refine existing records management protocols for asset related information, and reimplement the protocols to ensure the information is readily accessible to support asset management program business needs.*

**BACKGROUND**

Work on this initiative has not yet begun.

**PREPARATORY WORK**

Work on this initiative has not yet begun.

**IMPLEMENTATION**

Work on this initiative has not yet begun.

**STEPS/TASKS**

- Review existing records management policy – NOT STARTED
- Define policy and protocols for records management – NOT STARTED
- Apply policy and protocols for new records and, retroactively, for existing ones – NOT STARTED

**Initiative 1.09.01: Define Protocols for Developing and Maintaining Operating Procedures****OVERVIEW**

*This initiative will define the protocols for developing, maintaining, and updating operations and maintenance manuals.*

**BACKGROUND**

Work on this initiative has not yet begun.

**PREPARATORY WORK**

Work on this initiative has not yet begun.

**IMPLEMENTATION**

Work on this initiative has not yet begun.

**STEPS/TASKS**

- Review existing O&M material development, maintenance and updating protocols – IN PROGRESS
- Define protocols for developing, maintaining, and updating O&M materials– NOT STARTED
- Develop SOP for managing O&M materials – NOT STARTED

## Initiative 1.10.02: Define Protocols for Maintenance Planning and Scheduling, and Monitoring and Controlling Maintenance Program Activities

### OVERVIEW

*This initiative will define the protocols for conducting maintenance planning and scheduling, and for monitoring and controlling maintenance program activities.*

### BACKGROUND

Maintenance work management is the process of recording, tracking and maintaining all maintenance activity data. The Computerized Maintenance Management System (CMMS), WAM in DWSD's case, is used to track the process from the original work request, through planning and scheduling the work, to documenting the work performed and resources spent.

### PREPARATORY WORK

An overarching Maintenance Management SOP was developed in September, 2014, before WAM had been configured to provide more work management and data collection capabilities.

As WAM configuration progressed, the SOP segment regarding work order closeout data collection was rewritten.

The planning and scheduling segment of the SOP has been rewritten in anticipation of WAM changes expected in August, 2015.

A procedure for analyzing backlog has been developed. The methods for resolving different categories of backlogged work is being drafted and will be finalized in September, 2015.

### IMPLEMENTATION

The work order closeout data collection procedure will be implemented, and training on the procedure delivered, following implementation of WAM Component, Failure and Repair codes in August, 2015.

### STEPS/TASKS

- Develop SOP for managing maintenance work – COMPLETED
- NEW-Develop codes and re-configure WAM for improved work management and analysis – IN PROGRESS
- Implement the planning and scheduling procedure by August, 2015 – IN PROGRESS
- NEW-Develop SOP for backlog analysis and resolution by September, 2015 – IN PROGRESS
- NEW – Develop performance metrics for Maintenance Planners – NOT STARTED

**Initiative 1.10.08: Define Processes for Evaluating Return on Maintenance Investments****OVERVIEW**

*This initiative will define the processes to periodically review and analyze return on maintenance program investments.*

**BACKGROUND**

Analyzing return on maintenance investments requires the compilation of accurate maintenance and asset data over 1 to 2 years. Our current focus is on identifying the key data required and configuring WAM to collect that data. Analyzing return on investment is a relatively low priority with implementation not expected before 2018.

**PREPARATORY WORK**

Work on this initiative has not yet begun.

**IMPLEMENTATION**

Work on this initiative has not yet begun.

**STEPS/TASKS**

- TBD

**Initiative 1.12.02.A: Develop Asset Management Process Diagrams and Procedure – PERMIT RELATED****OVERVIEW**

*This initiative will develop asset management process diagrams, and a corresponding procedure to provide supplemental guidance for process implementation.*

**BACKGROUND**

An understanding of the relationships of the individual asset management processes to each other and to the CIP planning process is essential to comprehensive asset management planning.

**PREPARATORY WORK**

Flowcharts for the individual asset management processes were developed under the processes' respective initiatives.

A high level SOP, incorporating the flowcharts developed, was drafted in March, 2015. The SOP also defines how outcomes of asset management processes feed the CIP planning process.

**IMPLEMENTATION**

The SOP provides an integrated view of individual AM processes and is not intended for independent implementation.

**STEPS/TASKS**

- Develop asset management process flowcharts – COMPLETED
- Develop SOP integrating the individual asset management processes – COMPLETED
- Continue to develop WAM's asset management capabilities – IN PROGRESS
- Refine the SOP to incorporate WAM in the processes – NOT STARTED

**Initiative 1.12.02.B: Define Protocols for Conducting Business Case Evaluations – PERMIT RELATED****OVERVIEW**

*This initiative will define protocols for how to conduct and document a business case evaluation.*

**BACKGROUND**

Given limited resources and competing investment opportunities, a systematic process for deciding how the resources should be spent is essential. A Business Case Evaluation (BCE) defines a concern requiring investment attention, analyzes the alternatives for addressing the concern, recommends how the selected alternative should be implemented, and provides the supporting documentation for proceeding with implementation.

**PREPARATORY WORK**

The protocols, based on those of WERF's Business Case Evaluation (BCE) tool, have been developed and include definitions of triggers/criteria that identify when a BCE should be performed and how results of the BCE will be utilized in asset management decision making.

An SOP for conducting a Business Case Evaluation (BCE), using the templates contained in WERF's Excel-based tool, was drafted in March, 2015. The protocols described above are incorporated into the SOP.

**IMPLEMENTATION**

Implementation of this initiative has not yet begun.

**STEPS/TASKS**

- Define evaluation protocols – COMPLETED
- Develop SOP and templates for conducting evaluations – COMPLETED
- Implement BCEs in developing CIP plans – NOT STARTED

**Initiative 1.12.02.C Define Protocols for Using the Asset Renewal Valuation Tool – PERMIT RELATED****OVERVIEW**

*This initiative will define protocols for using the asset renewal valuation tool to forecast asset renewal/replacement needs, including how outputs feed into the budget planning process and the annual asset management plan.*

**BACKGROUND**

To assess the likelihood of an asset's failure, a practical determination must be made of that asset's remaining useful life. The factors that determine remaining useful life include the asset's installation date; the expected life of that class of asset; and the asset's condition, performance and reliability ratings. Knowing an asset's remaining useful life, and the lead time needed to effect a re-investment strategy (repair, refurbish or replace), allows a more accurate assessment of when an asset should be repaired, refurbished or replaced.

In preparation for using the ARVF tool, the following Initiatives need to be completed:

- Initiative 1.01.04 Define Minimum Required Level of Service
- Initiative 1.02.03 Define Asset Condition, Performance, and Reliability Assessment Protocols
- Initiative 1.03.02 Define Asset Effective and Remaining Useful Lives
- Initiative 1.03.06 Define Asset Business Risk Exposure

**PREPARATORY WORK**

Initiative 1.01.04 Define Minimum Required Level of Service at the Asset Level has been started

Initiative 1.02.03 Define Asset Condition, Performance, and Reliability Assessment Protocols is complete

Initiative 1.03.02 Define Asset Effective and Remaining Useful Lives is complete

Initiative 1.03.06 Define Asset Business Risk Exposure is complete

An SOP was developed, based on WERF's ARVF tool, for forecasting when an asset would need replacing or refurbishing. This task was completed in April 2015.

**IMPLEMENTATION**

The ARVF tool was used to forecast the renewal dates for the 355 critical WWTP assets; the minimum level of service (an optional field in the ARVF tool) was not used during this forecast. The renewal forecasting for the critical WWTP assets was completed in March 2015.

**STEPS/TASKS**

- Develop SOP for using WERF's Asset Renewal Valuation Forecasting tool - COMPLETED
- Finish Initiative 1.01.04, defining the minimum levels of service for WWTP and CSO assets – NOT STARTED
- Reconfigure WAM and develop data collection templates as noted in Initiative 1.02.03 -IN PROGRESS
- Enter asset installation date; the expected life of that class of asset; and the asset's condition, performance and reliability ratings into WAM as noted in Initiative 1.03.02 –NOT STARTED
- Procure and configure an AM modelling tool (like RIVA) to analyze data entered/accumulated within WAM as noted in Initiative 1.03.02 – NOT STARTED

## Initiative 2.0: Asset Management Program Rollout

### OVERVIEW

*This initiative will develop a presentation and training delivery plan to support rollout of the asset management program design.*

### BACKGROUND

Once the asset management program has been developed, training on the elements of the program, and every employee's role in the program's success, needs to be developed, planned and delivered.

### PREPARATORY WORK

Implementation of the preceding initiatives is underway at the WWTP, primarily for the 355 most critical assets.

In taking the steps needed to configure WAM as a comprehensive asset management platform, the WWTP OAM has been working with the Finance, Water, Systems Control Center and Field Services divisions to develop WAM codes and configurations to meet asset management needs throughout the Department. The entire Department is, through these efforts, being exposed to the initiatives being implemented at the WWTP.

Upon implementation of all initiatives at the WWTP, the Department-wide asset management program will be developed.

### IMPLEMENTATION

Work on this initiative has not yet begun.

### STEPS/TASKS

- Develop and deliver the asset management program presentation – NOT STARTED
- Develop the training plan – NOT STARTED

**Initiative 3.0 – Collect Assets & MMIs Data****OVERVIEW**

*This initiative will collect the attribute information and data elements defined by other initiatives for asset and maintenance managed items identified in asset registers.*

**BACKGROUND**

Before asset/MMI data can be collected, the following Initiatives need to be completed:

- Initiative 1.01.04 Define Minimum Required Level of Service at the Asset Level
- Initiative 1.02.01.A Define Asset Registers Structures and Asset Identification Protocols
- Initiative 1.02.02 Define Attribute Information to be Collected for Assets & MMIs
- Initiative 1.02.03 Define Asset Condition, Performance, and Reliability Assessment Protocols
- Initiative 1.03.02 Define Asset Effective and Remaining Useful Lives
- Initiative 1.03.06 Define Asset Business Risk Exposure
- Initiative 1.12.02.C Define Protocols for Using the Asset Renewal Evaluation Tool

**PREPARATORY WORK**

Initiative 1.01.04 Define Minimum Required Level of Service at the Asset Level has been started

Initiative 1.02.01.A Define Asset Registers Structures and Asset Identification Protocols is nearly complete

Initiative 1.02.02 Define Attribute Information to be Collected for Assets & MMIs is nearly complete

Initiative 1.02.03 Define Asset Condition, Performance, and Reliability Assessment Protocols is complete

Initiative 1.03.02 Define Asset Effective and Remaining Useful Lives is complete

Initiative 1.03.06 Define Asset Business Risk Exposure is complete

Initiative 1.12.02.C Define Protocols for Using the Asset Renewal Evaluation Tool is complete

**IMPLEMENTATION**

Data collection has not yet begun.

**STEPS/TASKS**

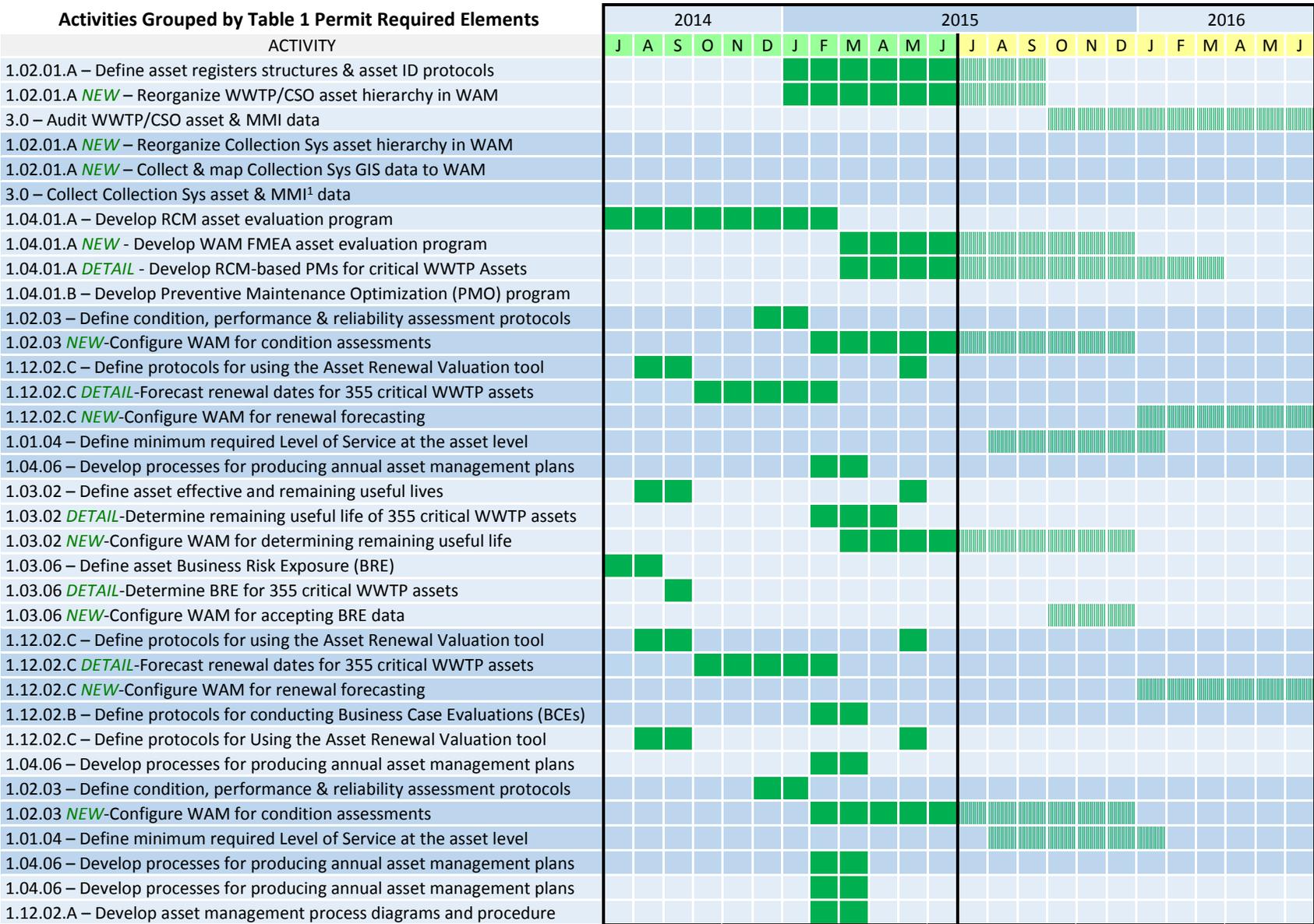
- Complete the asset hierarchy data collection and asset register re-structuring in August, 2015 – IN PROGRESS
- Complete all other initiatives – IN PROGRESS
- Audit all WWTP and CSO assets, collecting missing/correcting inaccurate data- NOT STARTED
- Audit all collection system assets – NOT STARTED

Table 4 provides a summary of the SOPs that have been developed under various initiatives.

Table 4: Status of Initiative SOPs

Initiative #	SOP	Delivered	Status
1.02.01.A	<b>NEW-Asset Hierarchy Strategy Document</b>	Mar, 2015	Draft
1.02.02	Define Attribute Information to be Collected for Assets & MMIs	Jun, 2015	Draft
1.02.03	Scoring & assessment protocols for Condition, Performance & Reliability	Apr, 2015	Draft
1.03.02	Defining Asset Effective and Useful Life	Apr, 2015	Draft
1.03.06	Defining Business Risk Exposure	MAR, 2015	Draft
1.04.01.A	SRCM protocols and activities	Mar, 2015	Draft
1.04.04	Calculating Asset Life Cycle Cost	May, 2015	Draft
1.04.06	Developing an Asset Management Plan	Apr, 2015	Draft
1.07.01.A	Asset Acquisition, Commissioning, Turnover, Disposal	Feb, 2015	Draft
1.09.01	Developing, Maintaining & Updating O&M Manuals	Apr, 2015	Draft
1.10.02	Attribute Data Collection	Apr, 2015	Draft
1.10.02	Work Management	Apr, 2015	Draft
1.12.02.A	DWSD AM Business Processes	Feb, 2015	Draft
1.12.02.B	Business Case Evaluation for AM Processes	Mar, 2015	Draft
1.12.02.C	Protocols for AM Renewal Valuation Tool	Apr, 2015	Draft

Table 5: Gantt Chart-Activities Grouped by Table 1 Permit Required Elements



█ COMPLETE █ PLANNED

Table 6: Gantt Chart-Activities Grouped by Initiatives

Activities Grouped by Initiatives	2014						2015						2016											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
1.01.04 – Define minimum required Level of Service at the asset level																								
1.02.01.A – Define asset registers structures & asset ID protocols																								
1.02.01.A <i>NEW</i> – Collect & map Collection Sys GIS data to WAM																								
1.02.01.A <i>NEW</i> – Reorganize Collection Sys asset hierarchy in WAM																								
1.02.01.A <i>NEW</i> – Reorganize WWTP/CSO asset hierarchy in WAM																								
1.02.03 – Define condition, performance & reliability assessment protocols																								
1.02.03 <i>NEW</i> -Configure WAM for condition assessments																								
1.03.02 – Define asset effective and remaining useful lives																								
1.03.02 <i>DETAIL</i> -Determine remaining useful life of 355 critical WWTP assets																								
1.03.02 <i>NEW</i> -Configure WAM for determining remaining useful life																								
1.03.06 – Define asset Business Risk Exposure (BRE)																								
1.03.06 <i>DETAIL</i> -Determine BRE for 355 critical WWTP assets																								
1.03.06 <i>NEW</i> -Configure WAM for accepting BRE data																								
1.04.01.A – Develop RCM asset evaluation program																								
1.04.01.A <i>DETAIL</i> - Develop RCM-based PMs for critical WWTP Assets																								
1.04.01.A <i>NEW</i> - Develop WAM FMEA asset evaluation program																								
1.04.01.B – Develop Preventive Maintenance Optimization (PMO) program																								
1.04.06 – Develop processes for producing annual asset management plans																								
1.12.02.A – Develop asset management process diagrams and procedure																								
1.12.02.B – Define protocols for conducting Business Case Evaluations (BCEs)																								
1.12.02.C – Define protocols for Using the Asset Renewal Valuation tool																								
1.12.02.C <i>DETAIL</i> -Forecast renewal dates for 355 critical WWTP assets																								
1.12.02.C <i>NEW</i> -Configure WAM for renewal forecasting																								
3.0 – Audit WWTP/CSO asset & MMI data																								
3.0 – Collect Collection Sys asset & MMI <sup>1</sup> data																								

COMPLETE
  PLANNED

## OTHER PERMIT REQUIRED UPDATES

The remainder of this document specifically responds to the required report elements delineated in Section 12.c.2) as follows:

**a) A description of the staffing levels maintained during the year.**

Month	2014						2015					
	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Staffing Totals	521	475	488	479	451	439	429	425	431	426	425	419

**b) A Summary of inspections and maintenance activities conducted and corrective actions taken during the previous year.**

**Attachment A** is a printout of one page of the CM, PM summary supplied by WAM (the CMMS application in place during this time period). It covers July 1, 2014 – June 30, 2015. A complete file is included with the DWSD electronic submittal. The complete file includes the WWTP and CSO basins.

**c) Expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions and capital investment during the previous year.**

The expenditures for operations and maintenance for FY 14-15 were **\$116,717,478**.

The CIP expenditures for FY 14-15 were **\$144,414,703**.

**d) A summary of asset/areas identified for inspection/action (including capital improvement) in the upcoming year (SRP).**

The FY 2014/2015 Scheduled Replacement Plan (SRP) is included in **Attachment B**. The reporting program that will be able to pull the inspection and scheduled work orders from WAM has not yet been developed (reconfiguring WAM for asset management functionality has taken precedence) but is expected to be available for future annual reports.

**e) A maintenance budget and capital improvement budget for the upcoming year, taking into account implementation of an effective asset management program meeting the core elements.**

The budget expenses for operation and maintenance for FY 15-16 are **\$116,690,401**.

The CIP budget for FY 2014-2015 is **\$151,827,350**.

**f) An updated estimate of the revenue necessary to complete the anticipated OM&R activities, the associated rate schedule impact, and an assessment of the adequacy of the revenue to perform necessary OM&R work.**

DWSD conducts an annual revenue review based upon budgeted expenditures and the Capital Improvement Plan. The next review will be for FY 2016-2017. This will begin early calendar year 2016.

## ATTACHMENT A

**PM/CM work order hours summary**  
 Listing Work Orders entered between 7/1/2014 and 6/30/2015

Work Order #	WO Status	WO Description	PM/C	Ste	Step Description	Entry Date	Complete Date	Labor Requirements				Est. Hrs	Comtd.
								Item	Men	Craft	Duration		
<b>80: WWTP-PUMP STATION</b>													
<b>6/29/2014</b>													
C005395	ACTIVE	PM Bi-Weekly Inspection of Elevator	PM	01	RUN CAR UP AND DOWN A FEW TIMESCHECK CABLESGREASE RAILSFILL UP AUTOMATIC OILERSCLEAN UP M.	06/24/2014		1	1	ELVM		2.00	
C005736	ACTIVE	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION SP-02	PM	01	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION	06/25/2014		1	1	OPER		1.00	
C005737	ACTIVE	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION SP-03	PM	01	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION	06/25/2014		1	1	OPER		1.00	
C005746	ACTIVE	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION SP-04	PM	01	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION	06/25/2014		1	1	OPER		1.00	
C005748	ACTIVE	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION SP-05	PM	01	BI-WEEKLY ONCE PER-SHIFT OPERATION FLOAT SWITCH INSPECTION	06/25/2014		1	1	OPER		1.00	
C006033	ACTIVE	18 MONTH LUBRICATION OF MOTOR BEARINGS	PM	01	18 MONTH LUBRICATION OF MOTOR BEARINGSLUBRICATE MOTOR BEAR	06/26/2014		1	2	ELEC		4.00	
C006251	ACTIVE	BI-MONTHLY MECHANICAL MAINTENANCE ON- PUMP STA #2, MAU-2	PM	01	***** LOCK OUT UNIT ***** CLEAN VENT SCREEN	06/27/2014		1	2	MECH		0.00	
								2	2	MECH		0.00	
C006253	ACTIVE	MONTHLY AIR HANDLING UNIT CHECKPUMP STA #2A, AHU-3	PM	01	MONTHLY CHECK ON #03*** SAFELY SHUT DOWN UNIT BEFORE SER	06/27/2014		1	2	OPER		1.00	
C006257	ACTIVE	QUARTERLY ELECTRICAL INSPECTION OF MOTOR	PM	01	QUARTERLY ELECTRICAL INSPECTION OF MOTOR MAKE SURE THE MOT	06/27/2014		1	2	ELEC		2.00	
C006271	ACTIVE	MONTHLY HVAC AIR FILTER RACK MAINTENANCE, PUMP STA-2A	PM	01	INSPECT AIR FILTERS, AND CHANGE AS NEEDED CLEAN (VACUUM) VENT	06/27/2014		1	2	OPER		1.00	
<b>7/6/2014</b>													
C006839	ACTIVE	YEARLY LUBE OIL SYSTEM MECH OIL CHANGE & FILTER PUMP #9	PM	01	MAIN PUMP #9 LUBE OIL SYSTEM-- YEARLY OIL	06/29/2014		1	2	MECH		4.00	
C006843	ACTIVE	YEARLY ELECTRICAL INSPECTION ON MAIN LIFT PUMP #14	PM	01	YEARLY ELECTRICAL INSPECTION ON PUMP CONTROLLERS PUMPINGSTA	06/29/2014		1	2	ELEC		8.00	
C006982	ACTIVE	MONTHLY INSPECTION FOR OIL AND CHEMICAL STORAGE	PM	01	OIL AND CHEMICAL STORAGE:1. ANY LEAKAGE FROM DRUMS OR CONTA	06/30/2014		1	1	MECH		1.00	
C007183	ACTIVE	QUARTERLY ELECTRICAL INSPECTION ON PUMP PUMPING STATION	PM	01	QUARTERLY ELECTRICAL INSPECTION ON PUMP PUMPINGSTATION:-MAI	07/01/2014		1	2	ELEC		8.00	
C007527	ACTIVE	BI-MONTHLY MECHANICAL LUBE & INSP ON SUPPLY AIR FAN #8ELECT BLDG #	PM	01	** DISCONNECT POWER TO UNIT & LOCKOUT BEFORE SERVICING *-1. R	07/02/2014		1	2	MECH		1.00	
C007856	ACTIVE	QUARTERLY ELECTRICAL INSPECTION OF MOTOR	PM	01	QUARTERLY ELECTRICAL INSPECTION OF MOTOR MAKE SURE THE MOT	07/03/2014		1	2	ELEC		2.00	
C007871	ACTIVE	BI-MONTHLY MECHANICAL LUBE & INSP ON BLEED AIR FAN #7PUMP STA #2A,	PM	01	** DISCONNECT POWER TO UNIT & LOCKOUT BEFORE SERVICING *-1. R	07/03/2014		1	2	MECH		0.00	
C009900	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-47A/B-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C009906	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-48C/D-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C009908	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-48A/B-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C009910	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-47C/D-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C009917	ACTIVE	WEEKLY OPERATIONS-LIST RUN TIME OF MAIN PUMPS-PS2A *CREW#4**	PM	01	WEEKLY OPERATIONS-LIST (TOTAL) RUN TIME OF MAIN PUMPS-PS2ALIS	07/11/2014		1	1	OPER		0.00	
C009976	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-34D-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C009977	ACTIVE	BI WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MC	PM	01	PUMP STATION 2A, AE-34A/B-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C009978	ACTIVE	*SAF: MONTHLY INSPECTION FOR OIL AND CHEMICAL STORAGE	PM	01	*SAF: MONTHLY INSPECTION FOR OIL AND CHEMICAL STORAGE:1. ANY LI	07/11/2014		1	1	MECH		1.00	
C009994	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-34C/E-NOTIFY OPERATIONS BEFORE STARTIN	07/11/2014		1	2	ITTE		2.00	
C015715	ACTIVE	Rsp #15 seal on pump is leaking. No seal water is going into the line.	CM	01	Rsp #15 seal on pump is leaking. No seal water is going into the line.	07/22/2014							
C030982	ACTIVE	WEEKLY CALIBRATION AND PERFORMANCE CHECK OF ATMOSPHERIC MONI	PM	01	PUMP STATION 2A, AE-35C/E-NOTIFY OPERATIONS BEFORE STARTIN	08/19/2014		1	2	ITTE		2.00	
<b>7/13/2014</b>													
C006590	CLOSED	PM Bi-Weekly Inspection of Elevator	PM	01	RUN CAR UP AND DOWN A FEW TIMESCHECK CABLESGREASE RAILSFILL	06/28/2014	#####	1	1	ELVM		2.00	2.00
C006595	FINISHED	PM Bi-Weekly Inspection of Elevator	PM	01	RUN CAR UP AND DOWN A FEW TIMESCHECK CABLESGREASE RAILSFILL	06/28/2014	#####	1	1	ELVM		2.00	
C008378	ACTIVE	QUARTERLY CALIBRATION AND PERFORMANCE CHECK OF THE RACK & GRI	PM	01	NOTIFY OPERATIONS BEFORE STARTING.PLACE THE GAS MONITOR IN TF	07/06/2014		1	2	ITTE		4.00	
C008482	ACTIVE	QUARTERLY CALIBRATION AND PERFORMANCE CHECK OF THE NORTH MOT	PM	01	NOTIFY OPERATIONS BEFORE STARTING.PLACE THE GAS MONITOR IN TF	07/07/2014		1	2	ITTE		4.00	
C008527	ACTIVE	QUARTERLY CALIBRATION AND PERFORMANCE CHECK OF THE SOUTH MOT	PM	01	NOTIFY OPERATIONS BEFORE STARTING.PLACE THE GAS MONITOR IN TF	07/07/2014		1	2	ITTE		4.00	
C008761	ACTIVE	QUARTERLY ELECTRICAL INSPECTION ON MLP #2	PM	01	QUARTERLY ELECTRICAL INSPECTION ON PUMP PUMPINGSTATION:-MAI	07/08/2014		1	2	ELEC		8.00	
C008762	ACTIVE	QUARTERLY ELECTRICAL INSPECTION ON MLP # 5	PM	01	QUARTERLY ELECTRICAL INSPECTION ON PUMP PUMPINGSTATION:-MAI	07/08/2014		1	2	ELEC		8.00	
C008763	ACTIVE	QUARTERLY ELECTRICAL INSPECTION ON MLP # 7	PM	01	QUARTERLY ELECTRICAL INSPECTION ON PUMP PUMPINGSTATION:-MAI	07/08/2014		1	2	ELEC		8.00	
C008780	ACTIVE	QUARTERLY ELECTRICAL INSPECTION OF LUB. SYSTEM FOR MLP #10	PM	01	QUARTERLY ELECTRICAL INSPECTION OF LUB. SYSTEM MAKE SURE THE	07/08/2014		1	2	ELEC		2.00	
C008809	ACTIVE	QUARTERLY ELECTRICAL INSPECTION ON MLP # 6	PM	01	QUARTERLY ELECTRICAL INSPECTION ON PUMP PUMPINGSTATION:-MAI	07/08/2014		1	2	ELEC		8.00	

## **ATTACHMENT B**

**DETROIT WATER & SEWERAGE DEPARTMENT  
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**USE ONE OBJECT CODE PER PAGE**

Requesting Cost Center: \_\_\_\_\_

Cost Center	Description	Quant.	Unit Price	Total Cost	From Yr 2015-2016 or New	Reconciliation/ Comment
<b>Secondary</b>						
422224	Waste Activated Sludge Pump #7-9, Sludge Process B	3	\$ 163,333	\$ 490,000	2015-2016	Provided under Small Cap Project SCP-PC-013. Ready for Advertisement.
422224	Flow Meters for Chlorinators	16	\$ 12,000	\$ 192,000	New	These Items were recommended for replacement in a Recent CS-1481 Meeting.
422224	Flow Meters for Sulphinator	14	\$ 12,000	\$ 168,000	New	These Items were recommended for replacement in a Recent CS-1481 Meeting.
422224	Hot water circulating pump #1,2. Chlorination Evaporator	2	\$ 3,000	\$ 6,000	2015-2016	Ok to buy two (2) spares
412221	<del>SFE Strainer, strainer shaft 1 thru 5, 7, 8</del>	<del>8</del>	<del>\$ 80,000</del>	<del>\$ 640,000</del>	2015-2016	Small Capitol Project done on #6 Strainer this year. Engineering needs to evaluate other Strainers.
412221	<del>SFE pump and motor</del>	<del>8</del>	<del>\$ 190,000</del>	<del>\$ 1,520,000</del>	2015-2016	Engineering needs to evaluate.
422224	<del>Chlorine solution pump</del>	<del>4</del>	<del>\$ 29,500</del>	<del>\$ 118,000</del>	2015-2016	Consultant under CS-1481 did not recommend their replacement since they are in good condition.
422224	<del>SO2 solution pump</del>	<del>4</del>	<del>\$ 29,500</del>	<del>\$ 118,000</del>	2015-2016	Consultant under CS-1481 did not recommend their replacement since they are in good condition.
422224	<del>Center drive motor and reducer, Complex A-Thickener</del>	<del>12</del>	<del>\$ 20,000</del>	<del>\$ 240,000</del>	2015-2016	Assumed replacement in 10 years - assets still in good condition so replacement not recommended.
422224	<del>Mixer motor #1 &amp; 2, Sludge Blend, Sludge Process-Complex A</del>	<del>2</del>	<del>\$ 29,500</del>	<del>\$ 59,000</del>	2015-2016	Assumed replacement in 10 years - assets still in good condition so replacement not recommended
422224	<del>Mixer 5 &amp; 6, Rectangular storage tank, Sludge-Process A</del>	<del>2</del>	<del>\$ 32,000</del>	<del>\$ 64,000</del>	2015-2016	Assumed replacement in 10 years - assets still in good condition so replacement not recommended
422224	<del>Mixer 1-4, Circular storage tank, Complex A</del>	<del>4</del>	<del>\$ 32,000</del>	<del>\$ 128,000</del>	2015-2016	There are no mixers, just blowers. The blowers are in good condition at this time and do not warrant replacement.
422224	<del>BSTP Pump, motor and drive #1, 2, 3, 4 Complex A</del>	<del>4</del>	<del>\$ 35,000</del>	<del>\$ 140,000</del>	2015-2016	The BSTP Pumps have been out of Service for a few years. Existing BSTP Pump Nos. 1 and 2 with Drives and Motors located in the Basement of Complex A are abandoned.
422224	<del>Sludge dewatering pump, motor, and drive at Sludge process A</del>	<del>9</del>	<del>\$ 130,000</del>	<del>\$ 1,170,000</del>	2015-2016	Assumed replacement in 10 years - assets still in good condition so replacement not recommended
422224	<del>Center drive motor and reducer, Complex B-Thickener</del>	<del>12</del>	<del>\$ 20,000</del>	<del>\$ 240,000</del>	2015-2016	Assumed replacement in 10 years - assets still in good condition so replacement not recommended
422224	<del>Sludge dewatering pump, motor, and drive at Sludge process B</del>	<del>6</del>	<del>\$ 160,000</del>	<del>\$ 960,000</del>	2015-2016	Assumed replacement in 10 years - assets still in good condition so replacement not recommended
<b>Dewatering</b>						
412225	<del>Pump, SFE #1 and 2, CII Dewatering</del>	<del>2</del>	<del>\$ 30,000</del>	<del>\$ 60,000</del>	2015-2016	SFE #1 new in 2014 and SFE #2 rebuilt in 2014.
412225	Pump, SFE booster, CII Dewatering	2	\$ 30,000	\$ 60,000	2015-2016	
<b>Incineration</b>						
422226	Burner Air Fan- Complex II Incineration	8	\$ 23,000	\$ 184,000	2015-2016	
422226	<del>Central Shaft Motors #7 thru 14 Complex II- Incineration</del>	<del>8</del>	<del>\$ 10,000</del>	<del>\$ 80,000</del>	2015-2016	New motors provided under PC791 Incinerator Improvements

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Requesting Cost Center: \_\_\_\_\_

Cost Center	Description	Quant.	Unit Price	Total Cost	From Yr 2015-2016 or New	Reconciliation/ Comment
422226	Central Shaft Cooling Fan #7 thru 14 Complex II Incineration	8	\$ 10,300	\$ 82,400	2015-2016	
422226	<del>Auxiliary Combustion Air Fan and motor #7 thru 14 Complex II Incineration</del>	<del>8</del>	<del>\$ 11,000</del>	<del>\$ 88,000</del>	2015-2016	Not recommended due to PC791 Incinerator Improvements
422226	Vacuum Pump, motor and drive, spare for A, B & C. Ash Silo, C-II	1	\$ 150,000	\$ 150,000	2015-2016	3 Vacuum Pumps were rebuilt in 2014. This unit will be a spare.
<b>Primary</b>						
412223	<del>Main Lift Pump # 1 to 8, Pump station # 1</del>	<del>8</del>	<del>\$ 900,000</del>	<del>\$ 7,200,000</del>	2015-2016	Deleted for fiscal yr. 2016/2017 since pumps will be provided later by 2019.
412223	<del>Main Lift Pump # 9 to 16, Pump station # 2</del>	<del>8</del>	<del>\$ 900,000</del>	<del>\$ 7,200,000</del>	2015-2016	Deleted for fiscal yr. 2016/2017 since pumps will be provided later by 2019.
412223	Primary Clarifier PC # 15 and 16 Cage and Arms	2	\$ 1,000,000	\$ 2,000,000	New	
412223	Raw Sewage Pump No. 11 and 14 Pump and Piping Modifications	2	\$ 1,000,000	\$ 2,000,000	New	
412223	Chillers for PS# 2A	2	\$ 250,000	\$ 500,000	New	
412223	HVAC for PS#1 Control Room	1	\$ 54,000	\$ 54,000	New	
412223	Replace siphon relief valves on RSP Pumps	8	\$ 10,000	\$ 80,000	New	
412223	Hydraulic Oil Pump Speed Reducer for PS 1A	8	\$ 2,000	\$ 16,000	New	
412223	Hydraulic Oil Pump for PS 1A	8	\$ 4,000	\$ 32,000	New	
412223	Hydraulic Oil Pump for PS 2A	7	\$ 4,000	\$ 32,000	New	
412223	Kilo Watt Meters with input to Ovation for RASP Pump Motors	8	\$ 10,000	\$ 80,000	New	
412223	Circular Primary Tank Clarifier Center Drive Remote Torque Monitoring signals to Ovation	6	\$ 10,000	\$ 80,000	New	
<b>Process Control (Network Devices)</b>						
422222	<del>Data concentrators, Pump St#1 Control Room</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	Done per Chris VanPoppelen
422222	Printers, Pump St#1 Control Room	1	\$ 1,000	\$ 1,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	Operator Consoles, Pump St#1 Control Room	1	\$ 150,000	\$ 150,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	Operator Console, Primary Head Sewage Plant Operator Building (Sludge Processing Complex A)	1	\$ 150,000	\$ 150,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	<del>Pump Station 2 Control Room (Motor-Floor) Remote I/O cabinet #1,</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	Done per Chris VanPoppelen
422222	<del>Remote I/O cabinet #2, Pump Station 2 Control Room (Electrical Room First Floor)</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	Done per Chris VanPoppelen
422222	<del>Remote I/O cabinet #3, Pump Station 2 Control Room (Chemical Addition Building Electrical Room)</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	Done per Chris VanPoppelen
422222	<del>Remote I/O cabinet #4, Pump Station 2 Control Room (1st Floor Electrical Room)</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	Done per Chris VanPoppelen

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Cost Center	Description	Quant.	Unit Price	Total Cost	From Yr 2015-2016 or New	Reconciliation/ Comment
422222	<del>Remote I/O cabinet #5, Pump Station 2 Control Room (Chemical Addition Building Electrical Room)</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	Done per Chris VanPoppelen
422222	Operator Consoles, Roof of EB-10	1	\$ 150,000	\$ 150,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	Printers, Roof of EB-10	1	\$ 1,000	\$ 1,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	<del>Operator Workstation, Secondary Head Sewage Plant Operator Building</del>	<del>1</del>	<del>\$ 5,000</del>	<del>\$ 5,000</del>	2015-2016	Done per Chris VanPoppelen
422222	Operator consoles, Incineration Complex II (fifth floor)	1	\$ 5,000	\$ 5,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	<del>AB PLC 5/05 Processor, Chlorination and Dechlorination Control Rooms</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	This was done under PC-786
422222	<del>Processor Control cabinets, Chlorination and Dechlorination Control Rooms</del>	<del>1</del>	<del>\$ 50,000</del>	<del>\$ 50,000</del>	2015-2016	This was done under PC-786
422222	Operator consoles, Chlorination and Dechlorination Control Rooms	1	\$ 5,000	\$ 5,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	<del>I/O Cabinets, Chlorination and Dechlorination Control Rooms</del>	<del>1</del>	<del>\$ 5,000</del>	<del>\$ 5,000</del>	<del>2015-2016</del>	This was done under PC-786
422222	<del>72" magmeter #A3, ILP Station 2</del>	<del>1</del>	<del>\$ 125,000</del>	<del>\$ 125,000</del>	<del>2015-2016</del>	Provided under CS-1498, Contract expected to be advertised next year. Will not be done in 2015/2016
422222	<del>72" magmeter #A4, ILP Station 2</del>	<del>1</del>	<del>\$ 125,000</del>	<del>\$ 125,000</del>	<del>2015-2016</del>	Provided under CS-1498, Contract expected to be advertised next year. Will not be done in 2015/2016
422222	60" Sonic Flow meter, SFE Line	1	\$ 100,000	\$ 100,000	2015-2016	
422222	48" Sonic Flow meter, SFE Line	1	\$ 80,000	\$ 80,000	2015-2016	
422222	<del>Accusonic Flowmeter, Detroit River Outfall #1</del>	<del>1</del>	<del>\$ 200,000</del>	<del>\$ 200,000</del>	2015-2016	Will be done under PC-797, Rouge River Outfall Disinfection Contract. Completion date is 12/31/2019.
422222	<del>Operator Workstation #2, Incineration Complex II (4th Floor Control Room)</del>	<del>1</del>	<del>\$ 5,000</del>	<del>\$ 5,000</del>	<del>2015-2016</del>	Done per Chris VanPoppelen
422222	<del>Opacity server, OAB Main Control Room (1st Floor behind MAP board)</del>	<del>1</del>	<del>\$ 150,000</del>	<del>\$ 150,000</del>	<del>2015-2016</del>	Upgraded under PC-744
422222	<del>Level Sensor, Pump Station #1 FeCl2 Tank</del>	<del>1</del>	<del>\$ 5,000</del>	<del>\$ 5,000</del>	<del>2015-2016</del>	System needs revision. Needs to be evaluated by Engineering.
422222	<del>Level Sensor, Pump Station #1 FeCl3 Tank</del>	<del>1</del>	<del>\$ 5,000</del>	<del>\$ 5,000</del>	<del>2015-2016</del>	System needs revision. Needs to be evaluated by Engineering.
422222	Level Sensor, Pump Station #1 Wet well	1	\$ 10,000	\$ 10,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	Level Sensor, Pump Station #2 Wet well	1	\$ 10,000	\$ 10,000	2015-2016	Ok to keep in the SRP per Chris VanPoppelen
422222	Operator console, Sludge Pumping Station #3 Control Room	1	\$ 150,000	\$ 150,000	2015-2016	Recently installed under PC- 780
422222	<del>CEM cabinet # 7-14 for THC control and monitoring</del>	<del>8</del>	<del>\$ 100,000</del>	<del>\$ 800,000</del>	2015-2016	New Air Conditioners installed in 2014 - Otherwise OK per Charles Ali
422222	<del>RAID 5 server at old admin bldg 1st floor</del>	<del>1</del>	<del>\$ 150,000</del>	<del>\$ 150,000</del>	2015-2016	Not recommended; the server was removed from the Old Admin Bldg.
<b>SFE System</b>						
422224	<del>Strainer</del>	<del>8</del>	<del>\$ 80,000</del>	<del>\$ 640,000</del>	2015-2016	Small Capitol Project done on #6 Strainer this year. Engineering needs to evaluate other Strainers.
422224	<del>SFE pump and motor</del>	<del>8</del>	<del>\$ 190,000</del>	<del>\$ 1,520,000</del>	2015-2016	Engineering needs to evaluate.

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Requesting Cost Center: \_\_\_\_\_

Cost Center	Description	Quant.	Unit Price	Total Cost	From Yr 2015-2016 or New	Reconciliation/ Comment
<b>Electrical</b>						
4222221	<del>15kV Primary Switchgear "AB" (EB-1)</del>	<del>1</del>	<del>\$ 200,000</del>	<del>\$ 200,000</del>	2015-2016	Replaced under PC-783 Electrical Power Contract
4222221	<del>15kV Primary Switchgear "BB" (EB-1)</del>	<del>1</del>	<del>\$ 200,000</del>	<del>\$ 200,000</del>	2015-2016	Replaced under PC-783 Electrical Power Contract
4222221	<del>5kV Substation "DE-1" (EB-1)</del>	<del>1</del>	<del>\$ 300,000</del>	<del>\$ 300,000</del>	2015-2016	Replaced under PC-783 Electrical Power Contract
4222221	<del>5kV MCC "ME" (EB-1)</del>	<del>1</del>	<del>\$ 45,000</del>	<del>\$ 45,000</del>	2015-2016	Replaced under PC-783 Electrical Power Contract
4222221	<del>5kV MCC "MD" (EB-1)</del>	<del>1</del>	<del>\$ 45,000</del>	<del>\$ 45,000</del>	2015-2016	Replaced under PC-783 Electrical Power Contract
4222221	<del>Primary Transformers A1, B1, &amp; C (EB-2)</del>	<del>1</del>	<del>\$ 80,000</del>	<del>\$ 80,000</del>	2015-2016	Replaced under PC-783 Electrical Power Contract
4222221	<del>Unit Substation "OP-2" (EB-18)</del>	<del>1</del>	<del>\$ 300,000</del>	<del>\$ 300,000</del>	2015-2016	Demolished under PC-783 Electrical Contract
422224	480V MCC-1 (EB-18)	2	\$ 45,000	\$ 90,000	2015-2016	37 Years old and only serves a few loads, loads are critical i.e. oxygen vaporizer; the Oxygen Plant is Out of Service. Proceed with the replacement of this asset or cancel it after the status of the Oxygen Building is determined. If decided to keep, consider replacing each MCC with a 480 V Power Panel.
4222221	<del>Unit Substation Switchgear (EB-19)</del>	<del>1</del>	<del>\$ 200,000</del>	<del>\$ 200,000</del>	2015-2016	Replaced under PC-740 Contract, approximately in Year 2000 _____
4222221	<del>Unit Substation "OP-1" (EB-19)</del>	<del>1</del>	<del>\$ 300,000</del>	<del>\$ 300,000</del>	2015-2016	Demolished under PC-783 Electrical Contract
412221	<del>480V MCC (EB-19)</del>	<del>2</del>	<del>\$ 45,000</del>	<del>\$ 90,000</del>	2015-2016	Field Check the MCC that remains or look on the PC-783 Drawings.
412221	480V MCC (EB-22)	1	\$45,000	\$ 45,000	2015-2016	Pilot Plant - 1970 installation Proceed with the replacement of this asset or cancel it after the status of the Pilot Plant Building is determined.
4222221	<del>Unit Substation "PT-1" (EB-23)</del>	<del>1</del>	<del>\$ 300,000</del>	<del>\$ 300,000</del>	2015-2016	Recently installed under PC- 780
412223	<del>480V MCC (EB-23)</del>	<del>2</del>	<del>\$ 45,000</del>	<del>\$ 90,000</del>	2015-2016	Recently installed under PC- 780
4222221	<del>5kV Switchgear "K-L" (EB-24)</del>	<del>1</del>	<del>\$ 200,000</del>	<del>\$ 200,000</del>	2015-2016	This 15 kV Switchgear was replaced in 2003 under PC-744.
412221	Main Distribution Panel "MDP-1" (EB-28)	1	\$ 50,000	\$ 50,000	2015-2016	
4222221	<del>Unit Substation "PT-2" (EB-29)</del>	<del>1</del>	<del>\$ 300,000</del>	<del>\$ 300,000</del>	2015-2016	Recently installed under PC- 780
412223	<del>480V MCC (EB-29)</del>	<del>2</del>	<del>\$ 45,000</del>	<del>\$ 90,000</del>	2015-2016	Recently installed under PC- 780
4222221	480 V Substation (EB-26) Replacement	1	\$ 1,200,000	\$ 1,200,000	New	SCP 001, document almost ready for advertisement
4222221	New EB-1 Roof	1	\$ 100,000	\$ 100,000	New	
422226	MCC's (EB-24, 25 and 26)	19	\$ 50,000	\$ 950,000	New	
4222221	!5 kV switches at EB-9 and 11	3	\$ 50,000	\$ 150,000	New	
4222221	Outdoor Substation at EB-13 A Rehabilitation	1	\$ 100,000	\$ 100,000	New	
4222221	New Fence for Outdoor Substation EB-13A		\$ 20,000	\$ 20,000	New	
	<b>Total</b>			<b>\$ 30,370,400</b>		

The DWSD definition of capital *equipment* covers the acquisition of tangible property not intended for resale with a useful life, which is greater than one (1) year, and where costs exceed \$1,000.

- |                         |        |                              |
|-------------------------|--------|------------------------------|
| Office Equipment        | 644118 | Shop Equipment               |
| Communication Equipment | 644115 | Computer Hardware & Software |
|                         | 644111 | ACQ Other Equipment          |