CAPACITY, MANAGEMENT, OPERATION AND MAINTENANCE (CMOM) PROGRAM

Milwaukee Metropolitan
Sewerage District

June 2014

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ACRONYMS

AIMS – Asset Information Management System
AM – Asset Management
AMP – Asset Management Plan
AMSA – Association of Metropolitan Sewerage Agencies (n/k/a NACWA)
AMT – Asset Management Team
AMWT – Asset Management Work Team
AWWA – American Water Works Association
BCA – Business Case Analysis
BOD – 5-day Biochemical Oxygen Demand
CIP – Capital Improvement Program
CCS – Central Control System
CFR – Code of Federal Regulations
CM – Corrective Maintenance
CMAR – Compliance Maintenance Annual Report
CMMS – Computerized Maintenance Management System
CMO – Constructability, Maintainability, and Operability
CMOM – Capacity, Management, Operations and Maintenance
CSO – Combined Sewer Overflow
DS – Diversion Structure
FFS – Flow Forecasting System
FPOPs – Facilities, Programs, Operational Improvements and Policies
GASB 34 – Governmental Accounting Standards Board Statement 34
GIS – Geographical Information System
HEC-RAS – Hydrologic Engineering Center-River Analysis System
HSPF – Hydrologic Simulation Program-Fortran
I/I – Infiltration and Inflow
IS – Intercepting Structure
ISS – Inline Storage System
IWPP – Industrial Waste Pretreatment Program
JIWWTP – Jones Island Wastewater Treatment Plant
LID – Low Impact Development
LOP – Level of Protection
LOS – Level of Service
LTCP – Long Term Control plan
MGD – Million Gallons per Day
MIS – Metropolitan Interceptor Sewer
MMSD – Milwaukee Metropolitan Sewerage District
MOUSE – Modeling of Urban Sewers
MP – Management Plan

NACWA – National Association of Clean Water Agencies (f/k/a AMSA)
NASSCO – National Association of Sewer Service Companies
NPDES – National Pollutant Discharge Elimination System
NSC – Near Surface Collector
O&M – Operations and Maintenance
ORP – Overflow Response Plan
PdM – Predictive Maintenance
PM – Preventive Maintenance
PPE – Personal Protective Equipment
QA – Quality Assurance
R&R – Refurbishment and Replacement
RaMP – Risk Management Priority Number
RCFA – Root Cause of Failure Analysis
RFA – Request for Assistance
RTC – Real Time Control
SCADA – Supervisory Control and Data Acquisition
SECAP – System Evaluation and Capacity Assurance Plan
SEWRPC – Southeastern Wisconsin Regional Planning Commission
SMP – Standard Maintenance Procedure
SOC-CA – Systems Operation and Control Contract Administrator
SOP – Standard Operating Procedure
SSO – Sanitary Sewer Overflow or Sanitary Sewer Outfall
SSWWTP – South Shore Wastewater Treatment Plant
TAT – Technical Advisory Team
TSS – Total Suspended Solids
USEPA – United States Environmental Protection Agency
UWS – United Water Services
VRSSI – Volume Reserved for Separate Sewage Inflow
WDNR – Wisconsin Department of Natural Resources
WMP – Watercourse Management Plan
WPDES – Wisconsin Pollutant Discharge Elimination System
WWPFMP – Wet Weather Peak Flow Management Program
WWTP – Wastewater Treatment Plant

DEFINITIONS

2020 Facilities Plan – Milwaukee Metropolitan Sewerage District's plan for facilities, policies, operational improvements and procedures for the planning horizon from 2000 to 2020.

Asset Management Work Team – A team of District and contract operator employees convened to provide input in developing the Asset Management Plan Strategy developed and documented in the *CMOM Strategic Plan*.

Biosolids – Stabilized solid matter resulting from the wastewater treatment process

Business Case Analysis – A method for determining and comparing the community benefits of a project to its total cost.

CMOM Strategic Plan – Documentation provided to the Wisconsin Department of Natural Resources in 2005. The CMOM Strategic Plan included strategies for the management plan, asset management plan, overflow response plan, system evaluation and capacity assurance plan, communication plan, audit plan and satellite effort that were further developed into the District CMOM Program.

Computerized Maintenance Management System – Database of assets, asset maintenance plans and work orders used for scheduling and tracking maintenance time and costs

Contract Operator – Private firm contracted by the Milwaukee Metropolitan Sewerage District to perform the maintenance and operation activities associated with the District's wastewater conveyance and treatment assets.

Corrective Maintenance – Maintenance activities intended to restore an asset from a failed condition to normal operation.

Diversion Structure (DS) – Structure built either on a combined sewer or on a combined sewer overflow to direct flow into a near surface collector sewer (where it is directed towards the Inline Storage System.) The diversion structure will generally handle wet weather flow above the capacity of the regulating device in the Intercepting Structure. Diversion structures can also be built in the same structure with the Intercepting Structure.

Dropshaft – Conveyance structure that is the primary vertical link between the near surface conveyance facilities and the deep Inline Storage System.

Great Plains – District asset accounting software and database.

Habitable Structure – As defined in WDNR NR 116.13 (2) Residential uses, (3) Accessory Uses, (4) Commercial Uses, (5) Manufacturing and Industrial Uses, (6) Storage of Materials, and (7) Public Utilities.

Intercepting Structure (IS) – Structure built on a combined sewer that intercepts dry weather flow and a portion of wet weather flow and directs it to the Metropolitan Interceptor Sewer (MIS) System. Intercepting structures use one of three types of devices to regulate the flow into the MIS. The devices are: 1) An orifice; 2) A tilting gate; or 3) A leaping weir.

Level of Protection – The wastewater flow (applies to flow in the conveyance system, at the treatment plants or in the watercourse system) recurrence interval that the District has identified and used for planning, designing, and constructing facilities to protect against SSOs, diversions, and surface flooding.

OWAM – Computerized maintenance management system presently used by the District's contract operator

Permit – Wisconsin Pollutant Discharge Elimination System permit issued to the Milwaukee Metropolitan Sewerage District (current permit was issued in 2013.)

Predictive Maintenance – Inspection, testing and maintenance activities that are primarily intended to determine an assets condition. Typical activities include sewer televising, structural inspections, vibration testing, and oil analysis.

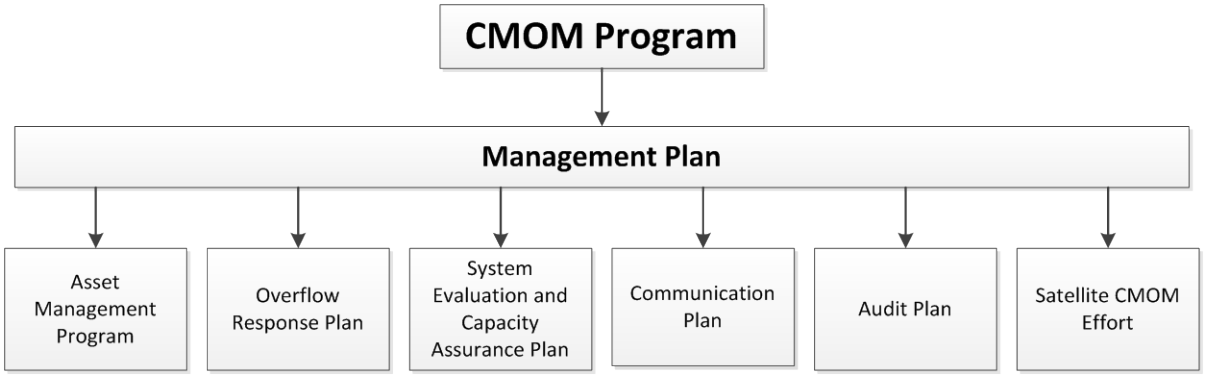
Preventive Maintenance – Maintenance activities intended to maintain the normal function of an asset.

Sewershed – Portion of the District service area. Sewersheds are delineated by sewer flow tributary area and do not cross municipal boundaries, meter basin boundaries or District sub-systems.

Stipulation – Agreement entered into between the Milwaukee Metropolitan Sewerage District and the State of Wisconsin in 2002 that specifies activities and projects the District must complete within a set timeframe.

Wastewater System – The system of Metropolitan Intercepting Sewers (MIS), including the intercepting structures, Near Surface Collector sewers (NSC), including diversion structures, Inline Storage System (ISS), Combined Sewer Overflow (CSO) and outfall sewers, and the wastewater treatment plants (Jones Island and South Shore) owned by the Milwaukee Metropolitan Sewerage District.

EXECUTIVE SUMMARY



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ES.1 CMOM PROGRAM BACKGROUND

The Milwaukee Metropolitan Sewerage District (MMSD or District) originally prepared Capacity, Management, Operations and Maintenance (CMOM) Program Documentation to satisfy a requirement of the stipulation agreement (Stipulation) (1) entered into between the District and the State of Wisconsin in May of 2002. In addition to the Stipulation requirements, the withdrawn Sanitary Sewer Overflow (SSO) rule (2) proposed by the United States Environmental Protection Agency (USEPA) in 2001 was used as a guide in the development of the District CMOM Program. The District CMOM Program documentation was completed in June 2007 based on the Stipulation requirements and the guidance proposed in the withdrawn SSO rule. As of August 1, 2013 CMOM Program requirements are now defined in Wisconsin Administrative Code Chapter NR 210.23 (3), with program development required by August 1, 2016. The District performed an audit of the entire CMOM Program to ensure compliance with the requirements of NR 210.23. The program modifications required based on the audit were implemented in June 2014.

This document describes the goals of the District CMOM Program, as well as the means and methods that the District has in place and is implementing to achieve the goals and ensure execution of the CMOM program.

ES.2 CMOM PROGRAM GOALS

The District has determined that CMOM principles will be applied not only to its wastewater conveyance system (as CMOM principles were described for), but to the District's wastewater treatment plants and jurisdictional watercourses also. The District has stated a goal for the overall CMOM Program, as well as goals for each of its areas of responsibility of conveyance, treatment, and watercourses.

The overall CMOM Program goal is:

> MMSD will implement and continuously improve a cost-effective CMOM Program based upon best practices for wastewater conveyance, wastewater treatment and watercourse management, which results in, maximizing the capacity of the existing and planned facilities to convey and treat wastewater, providing flood management, and improving water quality in the MMSD service area. The program must be consistent with goals from other MMSD policies and facilities plans.

The goals for the conveyance, treatment and watercourse areas are:

Conveyance

MMSD will implement and continuously improve a CMOM Program with the intent of eliminating all SSOs except those caused by circumstances as defined by Title 40 of the Code of Federal Regulations (CFR) §122.41 (m) (4), and minimizing CSOs in accordance with the current discharge permit.

Treatment

MMSD will implement and continuously improve a CMOM Program for cost-effective wastewater treatment that will achieve and sustain:

- Effluent, biosolids, and air emissions quality meeting or better than regulatory and permit requirements.
- Sustain operational readiness, reliability, and redundancy for liquid and solids processing.
- Achieve AM implementation.
- Improve coordination of wastewater treatment plant operations with collection system facilities and staff.
- Improve proper work management related to maintenance.

Watercourse

MMSD will implement and continuously improve a CMOM Program intended to minimize the risk of flooding associated with the one percent probability flood event to habitable structures along jurisdictional streams in an environmentally responsible and cost-effective manner, through updating and implementing its Watercourse Management Plan.

ES.3 CMOM PROGRAM COMPONENTS

The District CMOM Program contains the chapters described below. The chapters contain language addressing how the District is applying CMOM principles to its conveyance, treatment, and watercourse facilities.

Management Plan (Chapter 2)

The Management Plan contains the goals and objectives, organizational structure to manage the CMOM Program, legal authority to control I/I, design criteria, benchmarking methods, performance measures and reporting methods for CMOM compliance reviews.

Asset Management Program (Chapter 3)

The Asset Management (AM) Program section provides an overview of the AM program history, program drivers, organizational structure to implement AM, continuous improvement process, and a description of the Asset Management Plans being developed by the District. This section references AM Program documents that contain more detailed information on the program, including the AM Policy, AM Strategy and the 2013 Gap Analysis.

Overflow Response Plan (Chapter 4)

The Overflow Response Plan contains the District procedures for being aware of, responding to and reporting of overflows. The response includes review and analysis to develop corrective actions, where necessary, to prevent future overflows.

System Evaluation and Capacity Assurance Plan (Chapter 5)

The System Evaluation and Capacity Assurance Plan contains the District's capacity evaluations for wastewater conveyance, wastewater treatment and watercourse systems. This plan includes descriptions of the generation of flows and loadings, system responses and identification of deficiencies relative to the desired level of protection against overflows and flooding.

Communication Plan (Chapter 6)

The Communication Plan contains the District plan for communicating its CMOM Program to stakeholders, including internal, regulatory and public stakeholders, as well as receiving feedback from stakeholders.

Audit Plan (Chapter 7)

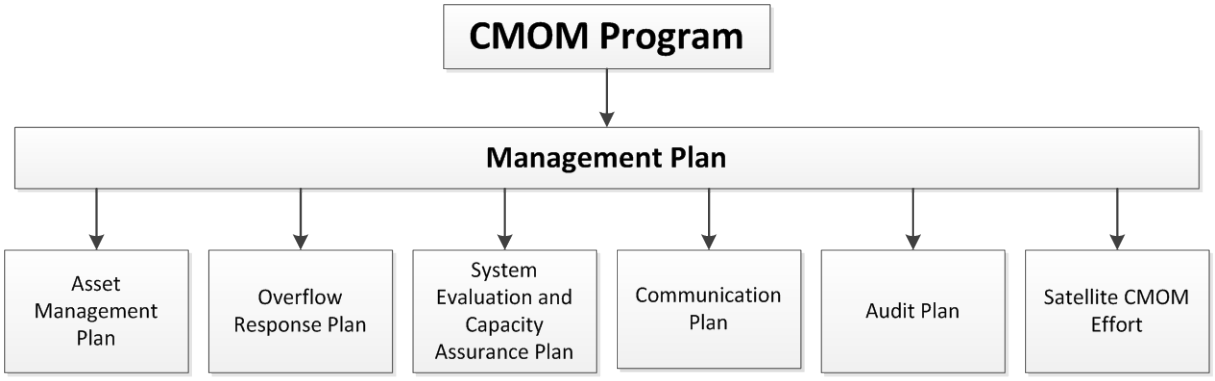
The Audit Plan contains the District plan for conducting an audit of the entire CMOM Program on a five year cycle.

Satellite CMOM Effort (Chapter 8)

Chapter 8 describes the efforts that the District has taken to date to meet the Stipulation requirements regarding inclusion of the satellite municipalities and development of a regional CMOM Program.

The Program, including objectives, strategies, tactics and other activities will be subject to change and refinement as the District continues implementing and gains experience with the CMOM Program. Future changes to the CMOM Program will be documented in District CMOM reports.

INTRODUCTION



Introduction

1.1 Background
1.2 Overview of the District
1.3 Chapter NR 210.23
1.4 District CMOM Program Structure

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1.1 BACKGROUND

The Milwaukee Metropolitan Sewerage District (MMSD or District) originally prepared Capacity, Management, Operations and Maintenance (CMOM) Program documentation to satisfy a requirement of the stipulation agreement (Stipulation) (1) entered into between the District and the State of Wisconsin in May of 2002. In addition to the Stipulation requirements, the withdrawn Sanitary Sewer Overflow (SSO) rule (2) proposed by the United States Environmental Protection Agency (USEPA) in 2001 was used as a guide in the development of the District CMOM Program.

The MMSD CMOM Readiness Review and Implementation Strategy Development (4) was completed in 2005. There are many items that were identified during the readiness review and strategy development and documented in the CMOM Strategic Plan that have been addressed as of the completion of this document. These items are still included to provide background information and continuity to the evolution of the CMOM Program. In addition, the strategies, tactics, and performance measures described will be subject to change and refinement as the District continues implementing and gain experience with the CMOM Program. The District CMOM Program documentation was completed in June 2007 in coordination with the 2020 Facilities Planning (8) process.

As of August 1, 2013 CMOM Program requirements are now defined in Wisconsin Administrative Code Chapter NR 210.23 (3), with program development required by August 1, 2016. The District performed an audit of the entire CMOM Program to ensure compliance with the requirements of NR 210.23. The program modifications required based on the audit were implemented in June 2014.

1.2 OVERVIEW OF THE DISTRICT

The Milwaukee Metropolitan Sewerage District is a special purpose District existing under the laws of the State of Wisconsin to provide regional wastewater treatment and flood management services. The District is governed by a commission of 11 members that are appointed by the mayor of the City of Milwaukee and the Intergovernmental Cooperation Council. The District's mission statement is:

To cost-effectively protect the quality of the region's water resources

The District's service area consists of Milwaukee County, except for the City of South Milwaukee, and portions of Ozaukee, Washington, Waukesha, and Racine Counties in the southeastern part of the State of Wisconsin.

The District currently owns approximately 300 miles of collection, conveyance and storage sewers and two regional wastewater treatment plants. The District also has jurisdictional authority to construct improvements over approximately 129.4 miles of watercourse systems within Milwaukee County.

1.3 CHAPTER NR 210.23

Chapter NR 210.23 lays out the requirements of a CMOM Program. The numbering sequence listed below coincides with NR 210.23 and describes how the District CMOM Program meets each of the requirements and where the information can be located within the District CMOM Program.

1. **CMOM Program Required**: Documentation of the program is complete.
2. **Implementation Date**: The District CMOM Program was implemented in June 2007.
3. **General Standards**: Items are addressed within the various components listed below.
4. **Components of CMOM Program**:
    a) **Goals** – See Section 2.2 of the CMOM Program
    b) **Organization** – See Section 2.3 of the CMOM Program
    c) **Legal authority** – See Section 2.4 of the CMOM Program
    d) **Operation and maintenance** – See Chapter 3 of the CMOM Program
    e) **Design and performance standards** – See Section 2.5 of the CMOM Program
    f) **Overflow emergency response plan** – See Chapter 4 of the CMOM Program
5. **Audit**: See Chapters 6 and 7 of the CMOM Program.
6. **Exceptions**: The District takes no exceptions.
7. **Compliance**: The District CMOM Program documentation is proof of compliance.

The Wisconsin Department of Natural Resources (WDNR) has not required the District to prepare a SECAP as part of Chapter NR 210.24, however, the District has chosen to

include it as part of its CMOM Program. The District SECAP is included as Chapter 5 of the CMOM Program.

1.4 DISTRICT CMOM PROGRAM STRUCTURE

The District CMOM Program is comprised of the following:

Management Plan (Chapter 2)

> The Management Plan contains the goals and objectives, organizational structure to manage the CMOM Program, legal authority, design and performance standards, benchmarking methods, performance measures and reporting methods for CMOM compliance reviews.

Asset Management Program (Chapter 3)

> The Asset Management (AM) Program section provides an overview of the AM program history, program drivers, organizational structure to implement AM, continuous improvement process, and a description of the Asset Management Plans being developed by the District. This section references AM Program documents that contain more detailed information on the program, including the AM Policy, AM Strategy and the 2013 Gap Analysis.

Overflow Response Plan (Chapter 4)

> The Overflow Response Plan contains the District procedures for being aware of, responding to and reporting of overflows. The response includes review and analysis to develop corrective actions, where necessary, to prevent future overflows.

System Evaluation and Capacity Assurance Plan (Chapter 5)

> The System Evaluation and Capacity Assurance Plan contains the District capacity evaluations for wastewater conveyance, wastewater treatment and watercourse systems. This plan includes descriptions of the generation of flows and loadings, system responses and identification of deficiencies relative to the desired level of protection against overflows and flooding.

Communication Plan (Chapter 6)

The Communication Plan contains the District plan for communicating its CMOM Program to stakeholders, including internal, regulatory and public stakeholders, as well as receiving feedback from stakeholders.

Audit Plan (Chapter 7)

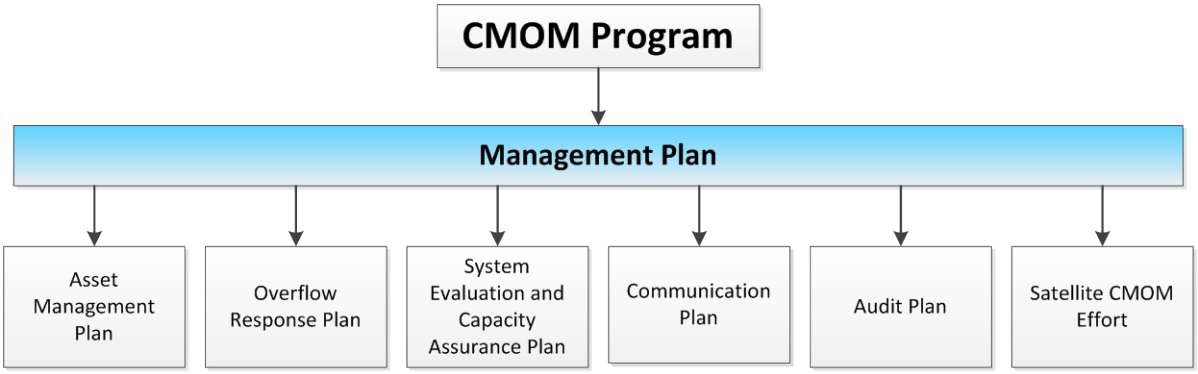
The Audit Plan contains the District plan for conducting an audit of the entire CMOM Program in the year 2012.

Satellite CMOM Effort (Chapter 8)

Chapter 8 describes the efforts that the District has taken to date meet the Stipulation requirements regarding inclusion of the satellite municipalities and development of a regional CMOM Program.

The Program, including objectives, strategies, tactics and other activities will be subject to change and refinement as the District continues implementing and gains experience with the CMOM Program. Future changes to the CMOM Program will be documented in District CMOM reports.

MANAGEMENT PLAN



Management Plan

2.1 CMOM Management Plan
2.2 Goal and Objectives
2.3 Organizational Structure
2.4 Legal Authority to Control I/I
2.5 Design Criteria
2.6 Benchmarking Data
2.7 Performance Measures
2.8 Reporting Methods for CMOM Compliance Reviews
2.9 Management Plan Updates

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2.1 THE CMOM MANAGEMENT PLAN

The Management Plan is the guiding document of the District CMOM Program. The first and most important items included in the Management Plan are the District goals (2.2). All other standards, rules and activities that are defined in the Management Plan and the other plans of the CMOM Program are supporting the achievement of the goals. The overall District goals are based on the following:

District Mission Statement

To cost-effectively protect the quality of the region's water resources.

District 2013-2015 Strategic Plan (5)

District 2035 Vision (6)

Consists of integrated watershed management and climate change adaptation with an emphasis on energy efficiency

Also included in the Management Plan are: the District's organizational structure (2.3), which includes a CMOM program manager; the District's legal authority (2.4); design and performance standards (2.5); the benchmarks that the District will use to compare itself to other agencies (2.6); the internal performance measures that the District will use to gauge effectiveness of its programs (2.7); reporting methods for CMOM compliance (2.8); and Management Plan Updates (2.9).

Each of these activities is fully described in the sections that follow.

2.2 GOALS AND OBJECTIVES

This first section of the Management Plan defines the District goals. In support of these goals are specific objectives, as well as the strategies and tactics that have already been or will be employed to achieve each objective. Also included in this section are the performance measures that the District will use to gauge achievement of each objective. The performance measures are regrouped and discussed again in section 2.7, with additional detail provided on the data requirements for determining the value of the performance measures.

The District is responsible for:

1) The regional collection, conveyance and storage (hereinafter referred to as conveyance) system that also includes green infrastructure for the purposes of this program;

2) The wastewater treatment plants; and

3) A large portion of the watercourse systems in the region.

The District is applying CMOM principles to all three service areas and has divided the CMOM Program into an overall component and a component for each of the three service areas. Goals, objectives, strategies, tactics and performance measures have been prepared for each component.

The overall component is discussed first, followed by the conveyance, treatment and watercourse components, in that order.

2.2.1 OVERALL PROGRAM GOAL

The overall CMOM Program goal, as developed by the District, in accordance with its Mission, is to implement and continuously improve a cost-effective CMOM Program based upon best practices for wastewater conveyance, wastewater treatment and watercourse management, which results in maximizing the capacity of the existing and planned facilities to convey and treat wastewater, providing flood management, and improving water quality in the MMSD service area. The program must be consistent with goals from other MMSD policies and facilities plans.

To achieve the overall program goal, the District will pursue the following objectives:

1. Continue the support of the CMOM Program within the District organizational structure (2.2.1.1)
2. Communicate the goals and objectives of the CMOM Program to internal and external stakeholders, monitor the CMOM Program, and institute program modifications (2.2.1.2)
3. Continue to maintain adequate financial planning (2.2.1.3)
4. Continue to comply with regulatory requirements (2.2.1.4)
5. Continue to support and monitor the regional CMOM program (2.2.1.5)
6. Continue to maintain a safe work environment and facilities and also sustain a competent workforce (2.2.1.6)

Each of these objectives is discussed in further detail below. The discussion includes the strategies and tactics that will be employed to achieve the objectives, as well as the performance measures defined to gauge achievement of the objectives.

2.2.1.1 OVERALL OBJECTIVE 1

Objective:

Continue the support of the CMOM Program within the District organizational structure.

Achieving this objective requires dedicating and organizing human resources toward activities that reduce Sanitary Sewer Overflows (SSOs)[1] and Combined Sewer Overflows (CSOs)[2], and striving to improve water quality, both in treatment plant effluent and in watercourse management. The District has established and filled the CMOM Program Manager position. The District is linking the CMOM Program with the Asset Management Program by having a single person be the manager of both.

Strategies:

- Continue to fund the CMOM /Asset Management Program Manager position.
- Continue to support the Asset Management Team (AMT).
- Continue to support the Asset Management Executive Steering Committee (AMESC).
- Establish the District framework for asset management

Tactics:

- Continue to define the roles and responsibilities of the CMOM /Asset Management Program Manager position
- Continue to define the roles and responsibilities of the AMT.

[1] Sanitary sewer overflow is defined by Wis. Adm. Code, sec. NR 210.03 (10)

[2] Combined sewer overflow is defined by Wis. Adm. Code, sec. NR 210.03 (3h)

- Maintain a CMOM review committee consisting of the CMOM Program Manager and one person from the areas of: Contract Compliance, Technical Services, Planning, Research, and Sustainability, Water Quality, and Legal. The committee will meet on an annual basis to review the CMOM Program Annual Report and on a 5 year basis to review updates to the CMOM Program documentation.
- Continue to define the roles and responsibilities of the AMESC.
- Continue to integrate the asset management commission policy throughout the District.
- Develop and implement the Asset Management Strategy for the District
- Develop Asset Management Plans (AMP) for all areas of service.

Performance Measures:

- Organizational Best Practices Index[3]
- Asset Management Team established and functioning
- Asset Management Executive Steering Committee established and functioning
- Asset Management Strategy established and updated annually
- Number of Asset Management Plans developed

2.2.1.2 OVERALL OBJECTIVE 2

Objective:

Communicate the goals and objectives of the CMOM Program to internal and external stakeholders, monitor the CMOM Program, and institute program modifications.

The strategies formulated to achieve this objective involve communicating with District employees, satellite system owners, customers, regulators, and other stakeholders. The communication must be two way: receiving feedback and suggestions on the CMOM

[3] Organizational Best Practices Index is also a Benchmark- see section 2.2.6 for further information

Program, and outputting information on various cycles regarding the CMOM Program. The strategies also must include the details on how the program will be monitored and the procedure for modifying program elements.

Strategies:

- Continue to support and improve an internal communications program that brings together periodic CMOM Program tracking data and provides this information to District staff.
- Continue to support and improve an external communications program that provides CMOM program tracking data relevant to each stakeholder group.
- Track specific CMOM strategies and tasks, including deliverables and performance measures, on an annual basis and report the results.
- Develop and maintain a continuous improvement process by obtaining input from District staff and stakeholders.

Tactics:

- Continue to monitor and modify (as necessary) performance measures that are easy to track and for which information is readily available.
- Prepare an annual CMOM report, detailing the work completed in the previous year
- Use the District's SharePoint web site to create a CMOM page to post information on the elements accomplished, performance measures and trending of performance measures.
- Use the District's public web site to post CMOM reports
- Prepare timely presentations to educate District staff and to provide updates regarding the CMOM/Asset Management Program.
- Prepare annual memoranda to the Commission on the status of the CMOM Program. Develop a template to address the same items regularly.
- Include on the CMOM web pages a tool for inputting suggestions regarding CMOM implementation. Include standard fields to get consistent information from each suggestion.

Performance Measures:

- CMOM page on the District's SharePoint site updated annually to include new reports and communications
- CMOM page on the District's public web site updated annually to include new reports and communications
- Annual Commission memorandum completed
- Annual reports completed on time (for five-year program audit)
- Annual cost of regional CMOM Program activities

2.2.1.3 OVERALL OBJECTIVE 3

Objective:

Continue to maintain adequate financial planning

The strategies formulated to achieve this objective involve using existing financial information that the District maintains and compiles.

Strategies:

- Review and update a list of current measures that indicate sound financial planning

Tactics:

- Coordinate with District Budget, Accounting, and Technical Services Capital Improvement Program staff to review and identify what changes need to be made.
- Maintain updated asset valuations.

Performance Measures:

- Percent of cash financing (six-year average)
- Outstanding Debt
- The six-year capital financing plan is updated and revised annually
- Bond Ratings

2.2.1.4 OVERALL OBJECTIVE 4

Objective:

Continue to comply with regulatory requirements.

This objective is included to ensure that as a main function, District compliance with its WPDES Permit (7) requirements is being fully addressed.

Strategies:

- Review the WPDES permit, existing and proposed State rules, and existing and proposed Federal rules for specific items that must be tracked and reported.

Tactics:

- Prepare annual compilation of statistics and trend results related to regulatory requirements

Performance Measures:

- Percent of flow into the system, resulting from wet weather events, that is captured and treated (calculated according to the formula stated in the District's 2013 WPDES permit, section 4.7)
- Percent of overflow and in-plant diversion events for which a public notification was issued
- Compliance Maintenance Annual Report (CMAR) overall score

2.2.1.5 OVERALL OBJECTIVE 5

Objective:

Continue to support and monitor the regional CMOM program

Supporting strategies would relate to assisting satellite municipalities with CMOM compliance activities.

Strategies:

- Provide assistance to District satellite municipalities on issues related to their compliance with District Rules and Regulations. (ongoing and continuing effort)

- Ensure that satellite municipalities are designing and constructing sewers and stormwater management features consistent with District Rules and Regulations. (ongoing and continuing effort)

Tactics:

- Review annual reports submitted by the satellites for CMOM compliance related items
- Provide feedback to satellite system owners based on their submitted reports
- Document and continue implementing the District sewer plan review process and Quality Assurance (QA) inspection process for satellite systems

Performance Measures:

- Percent of sewer plans reviewed by the District within deadlines established by District Rules
- Percent of municipal sewer construction projects receiving QA inspection as defined by the QA program

2.2.1.6 OVERALL OBJECTIVE 6

Objective:

Continue to maintain a safe work environment and facilities and also sustain a competent workforce.

Strategies:

- Maintain safety training programs (ongoing and continuing effort)
- Support development of the Talent Development Program

Tactics:

- Continue to provide assistance to employees related to certifications, licenses, etc. required by a position
- Continue to provide opportunities for employees to attend educational training seminars, conferences and classes.
- Continue to provide regular safety training including but not limited to CPR, confined space entry, first aid, and rescue training

- Continue to provide employees with Personal Protective Equipment (PPE)
- Continue to provide information and input to the development of the Talent Development Program
- Contractors maintain a safe work environment
- District maintains facilities that are employees, contracts, and general public

Performance Measures:

- Annual regulatory training completed
- Annual training hours per employee
- Employee Health and Safety Severity Rate

2.2.2 CONVEYANCE GOAL

The goal for the conveyance service area, as developed by the District, in accordance with its mission, is to implement and continuously improve a CMOM Program with the intent of eliminating all SSOs except those caused by circumstances as defined by Title 40 of the Code of Federal Regulations (CFR) §122.41 (m) (4), and minimizing CSOs in accordance with the current discharge permit.

To achieve the conveyance goal, the District will pursue the following objectives:

1. Establish CMOM program elements specific to minimizing the number and volume of CSOs (2.2.2.1)
2. Continue to implement and support the Wet Weather Peak Flow Management Program (WWPFMP) (2.2.2.2)
3. Where possible, establish additional practices to prevent SSOs, maintain or improve system performance, and avoid preventable failures (2.2.2.3)
4. Continue to establish and document level of protection, design, and performance standards for new conveyance assets constructed in the District service area, and consider documented and predicted changes in climate (2.2.2.4)
5. Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels (2.2.2.5)
6. Enhance District level of knowledge and understanding of wet weather flows and system response to precipitation and other factors (2.2.2.6)

7. Provide information receipt, response activity, and feedback regarding customer inquiries (2.2.2.6)

Each of these objectives is discussed in further detail below. The discussion includes the strategies and tactics that will be employed to achieve the objectives, as well as the performance measures defined to gauge achievement of the objectives.

2.2.2.1 CONVEYANCE OBJECTIVE 1

Objective:

Establish CMOM program elements specific to minimizing the number and volume of Combined Sewer Overflows (CSOs)

Although combined sewer flow and separate sewer flow eventually commingle within the District system, CSOs are regulated differently from SSOs. For CSOs, the 2013 WPDES permit requires the District to comply with various operational and technology-based requirements and to achieve certain standards. The District plans to apply CMOM to CSOs and combined sewer systems even though CMOM principles were originally developed for SSOs and sanitary sewer systems. The strategies to achieve CSO control may mirror those for controlling SSOs.

Strategies:

- Incorporate into the CMOM Overflow Response Plan (ORP) any specific requirements for CSOs from the District system.
- Implement the 2020 Facilities Plan and draft Regional Green Infrastructure Plan recommendations with respect to CSOs.
- Ensure operational readiness of all existing District overflow control facilities, including facilities constructed to prevent building sewer back-ups.

Tactics:

- Ensure the Operational and Technology-Based Requirements for CSOs are being implemented as documented.
- Develop and implement opportunistic sewer separation guidelines
- Continue to implement a green infrastructure program
- Implement the facilities plan recommendations with respect to CSOs.

- Include requirements in the operations contract for inspecting and ensuring proper operation of combined sewer facilities (intercepting structures, diversion structures, and combined sewer outfalls)
- Provide details in the ORP that include overflows from the combined sewer service area

Performance Measures:

- Number of wet weather CSO events
- Ratio of unused volume of the Inline Storage System (ISS) to the wet weather CSO volume for each event
- Number of gallons of green infrastructure capacity in the planning area
- Number of rain barrels distributed

2.2.2.2 CONVEYANCE OBJECTIVE 2

Objective:

Continue to implement and support the Wet Weather Peak Flow Management Program (WWPFMP)

Under the WWPFMP, the District evaluates flows from satellite municipalities using a metershed capacity allocation process which considers base and peak flows. Chapter 2 of the District Rules and Regulations articulate the current process for administering capacity. Chapter 3 of the District's Rules includes standards for metersheds for the maximum allowable peak hourly flow rate.

Strategies:

- Establish network of meters in the District's conveyance system to evaluate flows from municipalities.
- Evaluate flow data and communicate results to municipalities when allowable peak flows are exceeded.

Tactics:

- Evaluate municipal flows on a metershed basis using flow data measured at meter sites.

- Correspond with municipalities on flow performance and infiltration and inflow reduction. Municipalities with noncompliant metered areas are required to develop and follow Peak Hourly Flow Rate Reduction Program Plans, according to MMSD Rules, sec. 3.202.

Performance Measures:

- Wet Weather Peak Flow Management Program remains active
- Percent of metersheds where compliance or non-compliance of contributing municipalities has been established

2.2.2.3 CONVEYANCE OBJECTIVE 3

Objective:

Where possible, establish additional practices to prevent SSOs, maintain or improve system performance, and avoid preventable failures.

Supporting strategies would relate to operations and maintenance, the industrial waste pretreatment program, real-time control systems and the ORP

Strategies:

- Evaluate standard operating and standard maintenance procedures for all critical conveyance facilities on an ongoing basis
- Implement the recommended studies and projects from the 2020 Facilities Plan for the conveyance system as defined by the 2020 Implementation Plan.
- Maintain beneficial use of real-time controls (RTC) to maximize effectiveness of wet weather conveyance capacity (ongoing and continuing effort)
- Continue to administer the District's approved industrial waste pretreatment program (IWPP) (District has had a regulatory-approved IWPP since 1983)
- Perform Root Cause Analyses (RCA) on SSOs
- Evaluate operational readiness of all existing District sanitary sewer overflow facilities, including facilities constructed to prevent building sewer back-ups.
- Implement and enforce requirements to reduce infiltration and inflow, such as MMSD Rules, secs. 3.107, 3.108, 3.109 and 11.202

Tactics:

- Complete a criticality review of conveyance assets
- Review standard operating procedures (SOPs) (District and contract operator's) regarding critical facilities
- Review standard maintenance procedures (SMPs) (contract operator's) for critical facilities
- Implement operator training on RTC (ongoing and continuing effort)
- Prepare list of recommendations to changes for SOPs and SMPs to reduce the risk of preventable SSOs, where possible
- Complete RCA on SSOs to determine the root cause of the overflow, the Level of Protection provided, and corrective action plans for reducing the risk of overflows
- Include requirements in the operations contract to maintain the current inspection and testing of SSOs to ensure their operational readiness, to the maximum extent possible, without causing an SSO
- Include requirements in the operations contract to have procedures for responding to overflows
- Incorporate into the ORP a system for feedback from field personnel
- Maintain communications with satellite system owners, through the TAT, on operations and maintenance issues that affect the capacity and function of District facilities
- Analyze VRSSI[4] predictions, post-event, for events that result in a CSO and/or SSO
- Continue to support the Private Property Inflow and Infiltration Program
- Take enforcement action against municipalities for illegal connections

[4] VRSSI – Volume Reserved for Separate Sewage Inflow is a predicted volume of inflow that must be reserved for flow from the separate sewer area and is used to determine the appropriate time to close the gates that allow combined sewage into the inline storage system.

Performance Measures:

- Number of dry weather overflows
- Number of wet weather SSOs
- Number of wet weather SSOs where wet weather event generated flow is less than the WDNR approved Level of Protection
- Volume of wet weather SSOs
- Volume of wet weather SSOs where wet weather event generated flow is less than the WDNR approved Level of Protection
- Number of building backups caused by the loss of capacity or function of a District facility
- Percent of total flow entering the conveyance system that is captured and treated
- Percent completion of post-overflow review process within one-year of overflow occurrence
- Regulatory-approved IWPP in operation

2.2.2.4 CONVEYANCE OBJECTIVE 4

Objective:

Continue to establish and document level of protection, design, and performance standards for conveyance assets constructed in the District service area, and consider documented and predicted changes in climate.

The 2020 Facilities Plan will determine the level of protection against overflows to be provided by the District's conveyance, storage and treatment system (Wastewater System). Design and performance standards for all assets will be based on providing this protection level.

Strategies:

- Review 2020 Facilities Plan target level of protection for conveyance assets.
- Audit the implementation of procedures established for asset creation, modification, and removal (Fixed Asset SOPs) and make corrections to the procedures, as necessary, to improve capture of critical asset information.

- Include requirements in the District operation and maintenance (O&M) contract for capture of information necessary to make asset life-cycle decisions
- As a component of the Asset Management Plan (AMP), ensure asset management procedures identify assets, their condition, and their replacement schedule
- Update the District's Geographic Information System (GIS) as conveyance construction projects are completed (ongoing and continuing effort)
- Perform a business case analysis, as defined by the AMP, on new capital projects and throughout the life of the project to ensure the project satisfies standards for project objectives, relevant project data, development and evaluation of options including costs and benefits (tangible and intangible), project work plan and milestones, and financial and environmental issues.
- Track implementation of the capacity improvement facilities identified in the 2020 Facilities Plan.
- Track long-term progress toward the 2035 Vision

Tactics:

- See the Asset Management Program (Chapter 3 of this document)

Performance Measures:

- Level of Protection defined (by the 2020 Facilities Plan) and approved by the WDNR for the Wastewater System
- Number of conveyance construction project updates to the GIS
- Backlog of conveyance construction project updates to the GIS
- Percent of conveyance assets with defined condition and management method (condition based monitoring, economic based strategy, run to failure) documented in the Asset Information Management System (AIMS).
- Facilities Plan implementation on schedule

2.2.2.5 CONVEYANCE OBJECTIVE 5

Objective:

> Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels.

This objective essentially defines Asset Management (AM). To achieve the objective, the District will need to follow the steps related to establishing AM as a core business practice. These steps include defining current asset management activities, benchmarking them against industry best practices, identifying priority areas for improvement, and establishing a plan for implementing AM. This process will both lower the cost of asset ownership and help to better define protection levels for the systems the District owns and operates.

Strategies:

- Document and define the existing District AM business practices (completed as of December 2005)
- Benchmark current AM business practices (completed as of December 2005)
- Identify areas of CMOM compliance supported by AM implementation
- Prepare an Asset Management Program (completed as of June 2007)
- Define an implementation process for AM
- Estimate implementation costs for action items
- Establish performance measures for implementation (completed as of June 2007)
- Consider the Triple Bottom Line costs of projects and project alternatives when making long-term decisions

Tactics:

- See the Asset Management Program (Chapter 3 of this document)

Performance Measures:

- Conveyance system integrity[5]
- Number of open preventive maintenance (PM) work orders older than 90 days (sewers)
- Number of open PM work orders older than 90 days (conveyance equipment and pump stations)
- Planned maintenance ratio (preventive (PM) and predictive (PdM) maintenance vs all maintenance): hours (sewers)
- Planned maintenance ratio (PM and PdM vs all maintenance): costs (sewers)
- Planned maintenance ratio (PM and PdM vs all maintenance: count (sewers)
- Planned maintenance ratio (preventive (PM) and predictive (PdM) maintenance vs all maintenance): hours (conveyance equipment and pump stations)
- Planned maintenance ratio (PM and PdM vs all maintenance): costs (conveyance equipment and pump stations)
- Planned maintenance ratio (PM and PdM vs all maintenance: count (conveyance equipment and pump stations)

2.2.2.6 CONVEYANCE OBJECTIVE 6

Objective:

Enhance District level of knowledge and understanding of wet weather flows and system response to precipitation and other factors.

The strategies employed to meet this objective will involve the collection, management and availability of monitoring data. The objective may include District and satellite data regarding sewer flows, precipitation, river levels, lake levels, and groundwater levels.

[5] Conveyance system integrity is also a benchmark, see section 2.2.6 for further information

Strategy:

- In cooperation with the TAT, implement and maintain a Wet Weather Peak Flow Management Program
- Review the system of monitoring data collection and storage as practiced by the District.

Tactics:

- Review process of correcting problems with monitoring equipment, implement recommendations for preventing and correcting problems identified
- Review locations of portable flow monitoring stations on an ongoing basis to verify best use
- Review calibration logs of all monitoring and measuring equipment to ensure data collected is accurate
- Review procedures for collecting, converting, managing, storing and using data.
- Prepare recommendations for ensuring data integrity, usefulness and availability
- Review system and procedures for collection of precipitation data

Performance Measures:

- Percent of flow monitors at critical sites repaired within 5 business days after reporting problems (unless problem requires replacement of equipment)
- Percent of flow monitors at non-critical sites repaired within 30 consecutive business days after reporting problems (unless problem requires replacement of equipment)
- Percent of critical monitoring sites with less than 5 business days of missing or bad data
- Percent of non-critical monitoring sites with less than 30 consecutive days of missing or bad data
- Percent of permanent monitoring sites calibrated [check and adjustment as necessary] annually
- Percent of rain gauges calibrated annually
- Percent of critical monitoring site data reviewed for QA within 30 days

- Percent of non-critical monitoring site, rain gauge, and water quality data reviewed for QA within 90 days

2.2.2.7 CONVEYANCE OBJECTIVE 7

Objective:

Provide information receipt, response activity, and feedback regarding customer inquiries.

Strategy:

- Review all typical points of contact with District customers and ensure that questions, complaints and requests are directed to the appropriate responding party in a timely manner.

Tactics:

- Review the procedures for recording, and responding to, customer inquiries (For the purposes of this objective, conveyance inquiries are defined as calls received concerning building backups, sewage overflows, spills into the system, clogged or collapsed sewers or structures, illegal dumping into sewers or catch basins, missing manhole covers or contractors interfering with or damaging District facilities, which are all potentially critical issues. The District is not always the responding party for these issues. Calls related to sewer extensions, connections, site development and other non-critical issues are not counted as inquiries for this objective.)
- Perform a review of customer inquiry documentation
- Prepare recommendations and implement procedures to maintain or improve service response for customers

Performance Measures:

- Percent of documented inquiries with a documented response

2.2.3 TREATMENT GOAL

The goal for the treatment service area, as developed by MMSD, in accordance with its mission, is to implement and continuously improve a CMOM Program for cost-effective wastewater treatment that will achieve and sustain:

- Effluent, biosolids, and air emissions quality meeting or better than regulatory and permit requirements.
- Sustain operational readiness, reliability, and redundancy for liquid and solids processing.
- Achieve AM implementation.
- Improve coordination of wastewater treatment plant operations with collection system facilities and staff.
- Improve proper work management related to maintenance.

To achieve the treatment goal, the District will pursue the following objectives:

1. Continue to provide effluent quality that meets or exceeds WPDES permit requirements and effluent quality goals (2.2.3.1)
2. Continue to optimize effectiveness of wet weather treatment capacity (2.2.3.2)
3. Continue to manage bio-solids in a manner that maximizes beneficial reuse in a cost effective manner. (2.2.3.3)
4. Continue to document capacity, design and performance standards for treatment plant assets, and consider documented and predicted changes to climate (2.2.3.4)
5. Minimize the cost and acceptable levels of risk of wastewater treatment asset ownership while achieving performance levels (2.2.3.5)

Each of these objectives is discussed in further detail below. The discussion includes the strategies and tactics that will be employed to achieve the objectives, as well as the performance measures defined to gauge achievement of the objectives.

2.2.3.1 TREATMENT OBJECTIVE 1

Objective:

> Continue to provide effluent quality that meets or exceeds WPDES permit requirements and effluent quality goals.

This objective is central to the District's mission statement of improving water quality and the state of the region's water resources. The District has a long track record for producing effluent quality better than the requirements of its WPDES permit. Both the

Jones Island and South Shore water reclamation facilities have not violated monthly discharge permit effluent requirements for the period of 1998 through 2013.

Strategies:

- For each treatment process unit, continue to determine the data needed to make operational decisions that will optimize treatment effectiveness.
- Continue to maximize the availability of treatment process units in operation at all times.
- Avoid in-plant diversions that do not meet WPDES requirements
- Continue to ensure that adequate solids handling capacity exists at both the Jones Island and South Shore Water Reclamation Facilities such that effluent quality is not negatively affected.

Tactics:

- Require the contract operator to review treatment processes and determine data needed to make good operational decisions, including information on the status and availability of the various units for each treatment process
- Ensure required data is being collected, managed and distributed properly to enable good decision-making
- Review decision method for taking process units out of operation
- Review abilities for restoring operations in process units

Performance Measures:

- Receipt of Gold or Platinum NACWA Peak Performance Award[6]
- Percent of time effluent BOD is in compliance with WPDES permit
- Percent of time effluent TSS is in compliance with WPDES permit

[6] The National Association of Clean Water Agencies (NACWA) issues Silver, Gold and Platinum awards to participating agencies. Silver is awarded for five or less permit violations, Gold is awarded for zero permit violations, and Platinum is awarded after five continuous years of receipt of the Gold award.

- Percent of time effluent fecal coliform count is in compliance with WPDES permit
- Percent of time effluent Phosphorous is in compliance with WPDES permit
- Percent of time effluent Ammonia is in compliance with WPDES permit
- Volume of in-plant diversions not consistent with the WPDES permit
- Number of in-plant diversions not consistent with WPDES permit requirements

2.2.3.2 TREATMENT OBJECTIVE 2

Objective:

Continue to optimize effectiveness of wet weather treatment capacity.

The effort behind this objective is to ensure treatment capacity is available and used effectively during wet weather. Maximizing the treatment capacity generally keeps the volume in the ISS minimized, which reduces the risk of causing combined sewer and sanitary sewer overflows.

Strategies:

- Ensure treatment plants have adequate capacity for wet weather flows as planned in the District's 2020 Facilities Plan.
- Ensure operational readiness of treatment process units in standby mode
- Use combined sewer wet weather flow treatment from the Inline Storage System in accordance with the WPDES permit

Tactics:

- Construct, operate, and maintain treatment plant capacity improvement projects as determined in the District's Facilities Plan
- Complete hydraulic and process capacity evaluations of the water reclamation facilities.
- Properly sequence maintenance and construction projects to minimize the impact to the capacity of unit processes.

- Continue to periodically review and update wet weather operating procedures to reflect constructed capacity improvements or changes in operating procedures that impact treatment capacity.

Performance Measures:

- Volume of sanitary sewer overflows that occurred when treatment plant capacity was below the planned wet weather capacity
- Number of sanitary sewer overflow events that occurred when treatment plant capacity was below the planned wet weather capacity

2.2.3.3 TREATMENT OBJECTIVE 3

Objective:

Continue to manage biosolids in a manner that maximizes beneficial reuse in a cost effective manner.

This objective reflects the role of biosolids management in protecting the effective wastewater treatment capacity and providing for disposal of biosolids. The District has a long standing practice of generating biosolids reuse products at the Jones Island Plant. Since 1926, The District has produced Milorganite® at the plant, which is used in many residential and commercial landscaping programs. Strategies should deal with adequate capacity of the biosolids handling processes and the effectiveness of the biosolids reuse program. MMSD should continue to review the reuse program both on a short- and long-term basis in order to protect its long-term viability.

Strategies:

- Minimize the overall total volume of biosolids.
- Continue to ensure that the contract operator is collecting all necessary characteristic data to maintain biosolids product quality.
- Closely monitor the beneficial biosolids reuse program in accord with WPDES requirements so that program effectiveness can be maintained.
- Continually review beneficial reuse options, on a near-term and long-term basis, in order to ensure a viable reuse program.

Tactics:

- Implement the biosolids recommendations of the 2020 Facilities Plan

- Monitor contract operator performance regarding biosolids production, quality and storage

Performance Measures:

- Percent of biosolids produced that are beneficially reused
- Total mass of biosolids produced

2.2.3.4 TREATMENT OBJECTIVE 4

Objective:

Continue to establish and document capacity, design and performance standards for treatment plant assets, and consider documented and predicted changes to climate.

The same AM strategic concepts discussed under Section 2.2.2.4 (conveyance) apply to the wastewater treatment assets.

Strategies:

- Review the 2020 Facilities Plan planned wet weather capacity for the Wastewater System and the impacts for the treatment plants (hydraulic and process capacities necessary to achieve the target Level of Protection)
- Prepare the Asset Management Plan
- Audit the implementation of procedures established for asset creation in 2001 (Fixed Asset SOPs) and make corrections to the procedures, as necessary, to improve capture of critical asset information.
- Include requirements in O&M contract for capture of information necessary to make asset life-cycle decisions
- As a component of the AM Program, ensure asset management procedures identify the asset, its condition, and replacement schedule.
- Perform a business case analysis, as defined by the AM Program, on new capital projects and throughout the life of the project to ensure the project satisfies minimum standards for project objectives, relevant project data, development and evaluation of options including costs and benefits (tangible and intangible), project work plan and milestones, and financial and environmental issues.
- Implement the capacity improvement facilities identified in the 2020 facilities plan.

Tactics:

- See the Asset Management Program

Performance Measures:

- Planned wet weather capacity defined (by the 2020 Facilities Plan) and approved by the WDNR for the Wastewater System
- Percent of treatment plant assets with defined condition and management method (condition based monitoring, economic based strategy, run to failure) documented in the Asset Information Management System
- Facilities Plan implementation on schedule for treatment plant studies and projects

2.2.3.5 TREATMENT OBJECTIVE 5

Objective:

Minimize the cost and risk of wastewater treatment plant asset ownership while achieving performance levels.

The same AM strategic concepts discussed above in section 2.2.2.5 (conveyance) apply to the wastewater treatment plants.

Strategies:

- Determine the cost of asset ownership of each treatment process.
- Determine an asset replacement schedule according to evaluation methods adopted by the AMT.
- Document and define District AM business practices.
- Benchmark current AM business practices.
- Identify areas of CMOM compliance supported by AM implementation.
- Prepare an Asset Management Plan
- Define an implementation process for AM.
- Estimate implementation costs for action items.

- Establish performance measures for implementation.

Tactics:

- See the Asset Management Program

Performance Measures:

- Number of outstanding open PM tasks
- Number of outstanding open CM tasks
- O&M cost per Million Gallons per Day (MGD) treated
- Number of Corrective Maintenance (CM) work orders older than 90 days (plant equipment)
- Planned maintenance ratio[7]: cost
- Planned maintenance ratio: hours
- Planned maintenance ratio: count of work orders
- Number of PM work orders older than 90 days (plant equipment)

2.2.4 WATERCOURSE GOAL

The goal for the watercourse management service area, as developed by the District, in accordance with its mission, is to implement and continuously improve a CMOM Program intended to minimize the risk of flooding associated with the one percent probability flood event to habitable structures along jurisdictional streams in an environmentally responsible and cost-effective manner, through updating and implementing its Watercourse Management Plan.

To achieve the watercourse goal, the District has stated the following objectives:

[7] Planned maintenance ratios indicate the amount of preventive and predictive maintenance to all maintenance, which includes corrective maintenance

1. Within jurisdictional streams, cost-effectively remove or reduce the consequences to habitable structures from flooding associated with the one-percent probability flood event (2.2.4.1)
2. Reduce the likelihood of new habitable structures being added to the one-percent probability floodplain (2.2.4.2)
3. Establish and document level of protection(inflow and infiltration reduction and flood risk reduction), design, and performance standards for new assets in the watercourse system (2.2.4.3)
4. Minimize the cost of watercourse asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels (2.2.4.4)
5. Continue to be a leader in the effort to improve the area's water quality (2.2.4.5)
6. Provide information receipt, response activity, and feedback regarding customer inquiries on the watercourse systems (2.2.4.6)

Each of these objectives is discussed in further detail below. The discussion includes the strategies and tactics that will be employed to achieve the objectives, as well as the performance measures defined to gauge achievement of the objectives.

2.2.4.1 WATERCOURSE OBJECTIVE 1

Objective:

Within jurisdictional streams, cost-effectively remove or reduce the consequences to habitable structures from flooding associated with the one-percent probability flood event

This objective addresses meeting the District level for flood protection. Strategies to accomplish it will include updating watercourse system plans, implementing recommended projects, and measuring the effectiveness of the solutions.

Strategies:

- Undertake updates to the Watercourse Management Plans (9) as needed or when new data is available.
- Develop and implement solutions that minimize the damage to structures from the one-percent probability flood event.

Tactics:

- Identify and define the flood risk for structures in the one-percent probability floodplain area.
- Complete Watercourse Management Plan studies
- Implement solutions from the Commission approved Watercourse Management Plans.
- Continue to acquire upstream land in a forward thinking manner via the Greenseams Program
- Seek grant opportunities for necessary projects not currently funded

Performance Measures:

- Number of habitable structures removed annually from the one-percent probability flood

2.2.4.2 WATERCOURSE OBJECTIVE 2

Objective:

Reduce the likelihood of new habitable structures being added to the one-percent probability floodplain

The District has adopted runoff management requirements in the MMSD Rules, Chapter 13, Surface Water and Storm Water. The rule is intended to mitigate the effects of new development and redevelopment on potential flooding. This objective is mainly addressed with Chapter 13 implementation, including the District's role in supporting and collaborating with municipalities as they work toward compliance.

Strategies:

- Continue to require watercourse designs to project out to future hydrologic conditions.
- Continue to work with municipalities in ensuring new development and redevelopment meet the intent of Chapter 13 requirements.
- Continue to work with municipalities to ensure stormwater discharges to watercourses do not increase flood risk.
- Continue to acquire ownership or conservation easements on land identified as providing natural water quantity and quality benefits.

- Continue to promote and implement storm water best management practices that reduce runoff volumes and rates
- Continue the District's information and education campaign related to stormwater runoff reduction practices.
- Continue to maintain District Jurisdictional Watercourses to prevent new structures from being added to the 1% probability floodplain

Tactics:

- Review all stormwater management plans required to be submitted by the Chapter 13 rule
- Identify areas that are cost-effective to purchase, or obtain easements on, for providing natural storm water storage
- Investigate methods for ensuring development does not occur in the floodplain
- Continue the Stormwater Best Management Practices Partnership Program
- Continue to promote stormwater runoff reduction practices[8] to developers, special-interest groups, students, and the public
- Continue watercourse scheduled inspections and inspections in response to complaints to identify obstruction that might add a new structure to the 1% probability floodplain.

Performance Measures:

- Percent of stormwater management plans reviewed within timeframe allowed
- Area of property protected/preserved through District ownership or conservation easements

[8] Stormwater runoff reduction practices includes downspout disconnection, rain barrels, cisterns, rain gardens, green roofs, rooftop storage, green parking lots, stormwater trees, porous pavement, pavement storage, bioretention, onsite filtering, pocket wetlands, french drains and dry wells, infiltration sumps, and compost amendments

- Number of presentations, by District personnel, that included information on water quality
- Number of watercourse obstructions removed that had potential to add new structures to the 1% probability floodplain.

2.2.4.3 WATERCOURSE OBJECTIVE 3

Objective:

Establish and document level of protection (inflow and infiltration reduction and flood risk reduction), design, and performance standards for new assets in the watercourse system.

The same AM strategic concepts discussed under Section 2.2.2.4 (conveyance) apply to the watercourse system.

Strategies:

- For each watercourse, determine the actual level of protection and establish what constraints exist for meeting the required level, if any.
- Include requirements in O&M inspection procedures for capture of information necessary to make asset life-cycle decisions
- As a component of the AM Program, ensure asset management procedures identify the asset, its condition, and replacement schedule.
- Perform an analysis, as defined by the AM Program, on new capital projects and throughout the life of the project to ensure the project satisfies minimum standards for project objectives, relevant project data, development and evaluation of options including costs and benefits (tangible and intangible), project work plan and milestones, and financial and environmental issues.
- Update the GIS as watercourse construction projects are completed
- Implement the improvements identified in the Watercourse Management Plans (see Chapter 5 of this document for further information on the Watercourse Management Plans.)

Tactics:

- See the Asset Management Program
- Establish criteria and procedures for conducting project prioritization

Performance Measures:

- Percent of watercourse assets with defined condition and management method (condition based monitoring, economic based strategy, run to failure)
- Number of jurisdictional watercourse construction project updates to the GIS
- Backlog of jurisdictional watercourse construction project updates to the GIS

2.2.4.4 WATERCOURSE OBJECTIVE 4

Objective:

Minimize the cost of watercourse asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels

The same AM strategic concepts discussed under Section 2.2.2.5 (conveyance) apply to the watercourse system.

Strategies:

- Determine the cost of asset ownership of each watercourse project.
- Determine needed maintenance schedule according to evaluation methods adopted by the AMT.
- Document and define the MMSD AM business practices.
- Benchmark current AM business practices.
- Identify areas of CMOM compliance supported by AM implementation.
- Define an implementation process for AM
- Estimate implementation costs for action items.
- Establish performance measures for implementation.
- Develop a method to track operations and maintenance costs and hours.

Tactics:

- See the Asset Management Program

Performance Measures:

- Percent of scheduled watercourse asset inspections completed
- Percent of scheduled watercourse asset criticality assessments completed

2.2.4.5 WATERCOURSE OBJECTIVE 5

Objective:

Continue to be a leader in the effort to improve the area's waterways

This objective deals directly with the District's mission to improve the quality of the regional waterways. Strategies will address the topics of habitat improvement, water quality improvement, and runoff reduction.

Strategies:

- Continue to rehabilitate concrete channels along jurisdictional watercourses consistent with the District Mission Statement and Commission Policy.
- Implement watershed wide green infrastructure practices.
- Encourage and promote stormwater runoff reduction practices.
- Continue to include habitat features, natural vegetation, and recreational opportunities where possible on District projects.
- Continue to maintain water quality monitoring stations

Performance Measures:

- Percent of jurisdictional watercourse with non-concrete stream beds

2.2.4.6 WATERCOURSE OBJECTIVE 6

Objective:

Provide information receipt, response activity, and feedback regarding customer inquiries on the watercourse systems.

Strategy:

- Review all typical points of contact with District customers and ensure that questions, complaints and requests are handled quickly and appropriately.

Tactics:

- Review the procedures for recording and responding to customer inquiries
- Perform a review of customer complaint logs
- Prepare recommendations and implement procedures to maintain expected service response for customers
- Implement the use of the watercourse maintenance management system for tracking and responding to customer inquiries

Performance Measures:

- Percent of documented inquiries with a documented response

2.3 ORGANIZATIONAL STRUCTURE TO MANAGE THE CMOM PROGRAM

This second section of the Management Plan includes an organizational chart and a description of the organizational requirements necessary for implementing the District CMOM program.

The District organizational chart is shown in Figure 2-1. The two divisions that have primary involvement in implementing the CMOM Program are the Planning, Research, and Sustainability Division and the Technical Services Division, both of which fall under the Executive Director's authority. Although the Executive Director is not involved in the daily aspects of implementing the CMOM Program, it is through his direction that it is being implemented. Therefore, the activities that will take place are all under his authority. In the Planning, Research, and Sustainability Division, the Asset Management area contains the CMOM Program Manager, the person responsible for day to day execution of the tactics discussed above. The job description for the District CMOM Program Manager is included as Appendix 2-1.

FIGURE 2-1: DISTRICT ORGANIZATIONAL CHART

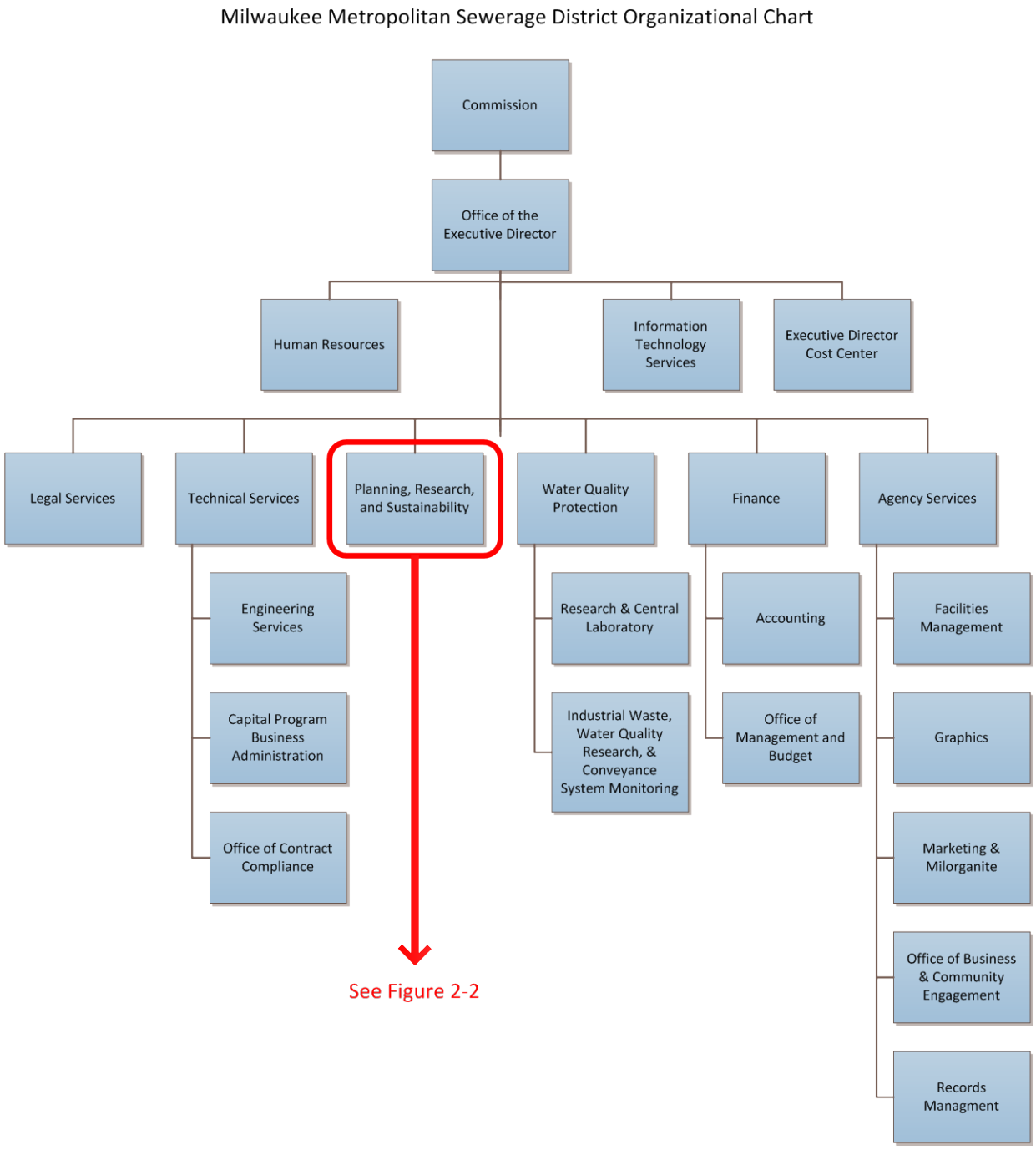
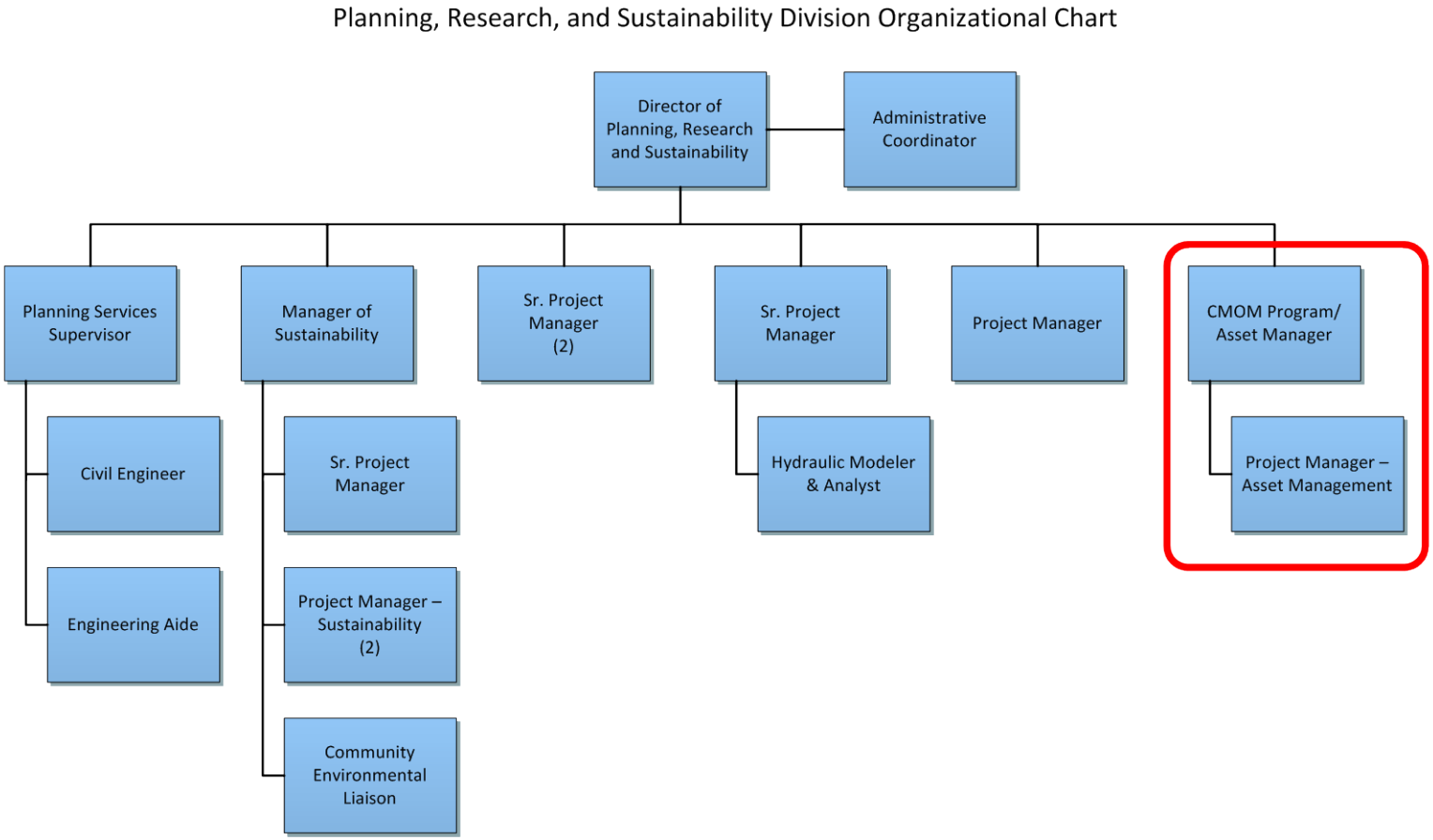


FIGURE 2-2: PLANNING, RESEARCH, AND SUSTAINABILITY DIVISION ORGANIZATIONAL CHART



2.4 LEGAL AUTHORITY

This third section of the Management Plan describes the legal authority that the District has regarding infiltration and inflow, new and rehabilitated sewers, sewage flows, and pollutants.

The District has Rules and Regulations (Rules) that must be followed by any person, including governmental units, that discharges wastewater into the MIS system. The entire text of the most up to date District Rules is available online at http://www.mmsd.com/rulesandregs/rules. Each area of legal authority is covered in the following Rules:

1. Infiltration and inflow sources: Chapter 2 covers general design and construction of sewers. Chapter 3 covers the operations and maintenance of satellite sewers
2. New sewers and connections: Chapter 2
3. New and rehabilitated sewers, lift stations and other collection system components or appurtenances: Chapter 2
4. Sewage flows from municipal satellite or other privately owned sewage collections systems: Chapter 3
5. Solid or viscous pollutants: Chapter 11
6. Enforcement Procedures: Chapter 11

2.5 DESIGN AND PERFORMANCE STANDARDS

This fourth section of the management plan describes sewer design and performance standards in effect in the District service area.

Chapter 2 of the District Rules addresses what design standards and specifications must be followed by satellite municipalities. The District's internal standards and specifications are based on The Standard Specifications for Sewer and Water Construction in Wisconsin (10) and Wisconsin Administrative Code Chapter NR 110.

In addition, Chapter 2 of the District Rules addresses required inspections and testing of sewers and manholes by satellite municipalities. The District's has internal specifications based on The Standard Specifications for Sewer and Water Construction in Wisconsin.

2.6 BENCHMARKING DATA

This fifth section of the Management Plan describes the measures the District will use to compare and improve its performance relative to other agencies. The measures that will be used for benchmarking are also listed above as performance measures. The performance measures that are also benchmarks are indicated with an asterisk in section 2.7 (Performance Measures.)

After a review of sources of information, it was determined that American Water Works Association (AWWA) had the most appropriate and comprehensive benchmarks for District performance measures. In previous years, Qualserve, a collaboration between the Water Environment Federation and AWWA, was used. The current District benchmarks are based off of AWWA's annual report, *Benchmarking Performance Indicators for Water and Wastewater Utilities: Survey Data and Analyses Report* (11).

In addition, the District has applied for and received gold and platinum awards from NACWA under the Peak Performance Awards. These awards are considered benchmarks as they apply to various wastewater utilities across the country.

The compliance maintenance annual report (CMAR) overall score, which must be completed per the WPDES permit, is considered a benchmark in that all utilities from Wisconsin must complete the CMAR and thus, it can be used for comparison.

The Benchmarking performance measures are shown in Table 2-1.

TABLE 2-1: DISTRICT BENCHMARKS

Benchmark	Comparison Source	Data Requirements	Reference Objective
Organizational Best Practices Index	AWWA – Benchmarking Performance Indicators for Water and Wastewater Utilities	Self rating on a scale of 1 to 5 in nine areas: Strategic planning, Long-term financial planning, Risk management planning, Performance measurement system, Optimized asset management program, Customer involvement program, Governing body transparency and accountability, Succession planning, Continuous improvement program	2.2.1.1 – Continue the support of the CMOM Program with the District Organization Structure
Bond Rating		Assigned by Rating Agencies	2.2.1.3 – Continue to maintain adequate financial planning
CMAR overall score	Wisconsin DNR	Determined through completing the CMAR form	2.2.1.4 – Continue to comply with regulatory requirements
Training hours per employee	AWWA – Benchmarking Performance Indicators for Water and Wastewater Utilities	Total training hours completed by District employees during the reporting period/total full time equivalent positions during the reporting period	2.2.1.6 – Continue to maintain a safe work environment and facilities and also sustain a competent workforce
Conveyance system integrity	AWWA – Benchmarking Performance Indicators for Water and Wastewater Utilities	100 x total number of collection system failures/total miles of pipe in collection system during reporting period (failures are defined as a loss of capacity resulting from a flow restriction (i.e. deposition of solids, structural failure, deterioration of materials, or root intrusion)	2.2.2.5 – Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels

Benchmark	Comparison Source	Data Requirements	Reference Objective
Planned maintenance ratio (conveyance): hours	AWWA – Benchmarking Performance Indicators for Water and Wastewater Utilities	100 x (hours of PM and PdM) / (hours of PM, PdM, and CM)	2.2.2.5 – Minimize the cost of conveyance asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels
Receipt of NACWA Peak Performance Award	NACWA	Yes/No	2.2.3.3 – Continue to provide effluent quality that meets or exceeds WPDES requirements and effluent quality goals
Planned maintenance ratio (treatment): hours	AWWA – Benchmarking Performance Indicators for Water and Wastewater Utilities	100 x (hours of PM and PdM) / (hours of PM, PdM, and CM)	2.2.3.6 – Minimize the cost of wastewater treatment plant asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels
O&M cost per MG treated	AWWA – Benchmarking Performance Indicators for Water and Wastewater Utilities	Total O&M costs for wastewater treatment/total volume processed during the reporting period	2.2.3.6 – Minimize the cost of wastewater treatment plant asset ownership while maintaining necessary stewardship of assets and achieving defined protection levels

2.7 PERFORMANCE MEASURES

This sixth section of the Management Plan lists all of the performance measures from the goals and objectives section. The performance measures are grouped in functional categories to allow easier viewing.

The performance measures are grouped first by whether they are in the overall component or one of the three service area components. The second grouping is by function.

For the overall component, the functional areas are:

- Program organization
- Communication
- Finance
- System performance
- Satellite systems
- Personnel & Safety

For the conveyance, treatment and watercourse components, the functional areas are:

- System performance
- System monitoring
- System conservation (watercourse only)
- Asset management
- Capital program implementation
- Customer service

The tables included below provide a listing of the performance measures for each component (Overall, Conveyance, Treatment and Watercourse) of the CMOM Program. Included in the tables are the functional area, performance measure name, data requirements, and the related objective.

All performance measures are on an annual basis, except for those with completion dates or otherwise noted. Evaluation of District performance, based on these measures, will be documented in the CMOM Program Annual Report and the Audit Report. For

further information, see the Communication Plan (Chapter 6 of this document) and the Audit Plan (Chapter 7 of this document).

TABLE 2-2: OVERALL PERFORMANCE MEASURES

Overall Functional Area	Measure *indicates the measure is also a benchmark (see 2.1.5)	Data Requirements	Reference Objective
Program Organization	Asset Management Executive Steering Committee established and functioning	Yes/No	2.2.1.1
Program Organization	Asset Management Strategy established and updated annually	Yes/No	2.2.1.1
Program Organization	Number of Asset Management Plans developed		2.2.1.1
Program Organization	Asset Management Team established and functioning	Yes/No	2.2.1.1
Program Organization	Organizational Best Practices Index*	See Benchmarking Data, Section 2.6 above	2.2.1.1
Program Organization	Annual cost of the regional CMOM Program activities		2.2.1.2
Communication	Annual Commission memorandum completed	Yes/No	2.2.1.2

Overall Functional Area	Measure *indicates the measure is also a benchmark (see 2.1.5)	Data Requirements	Reference Objective
Communication	CMOM page on the District's SharePoint site updated annually to include new reports and communications	Yes/No	2.2.1.2
Communication	CMOM page on the District's public web site updated annually to include new reports and communications	Yes/No	2.2.1.2
Communication	Annual CMOM report completed on time	CMOM Program Annual Report completion date	2.2.1.2
Finance	Bond Ratings*	See Benchmarking Data, Section 2.6 above	2.2.1.3
Communication	Percent of overflow and in-plant diversion events for which a public notification was issued	Overflow events, Overflow events with public notification	2.2.1.4
Finance	Six-year capital financing plan is updated and revised annually	Yes/No	2.2.1.3
Finance	Outstanding Debt		2.2.1.3
Finance	Percent of cash financing (six-year average)		2.2.1.3

Overall Functional Area	Measure *indicates the measure is also a benchmark (see 2.1.5)	Data Requirements	Reference Objective
System Performance	CMAR overall score*	See Benchmarking Data, Section 2.6 above	2.2.1.4
System Performance	Percent of flow into system, resulting from wet weather, that is captured and treated	Volume of flow discharged from treatment plants, volume of CSOs, average daily base flow (calculated according to the formula stated in the District's 2003 WPDES permit, section 4.7)	2.2.1.4
Satellite systems	Percent of municipal sewer construction projects receiving QA inspection as defined by the QA program	Sewer construction projects, Sewer construction projects visited at least once	2.2.1.5
Satellite systems	Percent of sewer plans reviewed by the District within deadlines established by the sewer plan review process	Sewer plans reviewed, Sewer plans submitted	2.2.1.5
Personnel & Safety	Annual regulatory training completed	Yes/No	2.2.1.6
Personnel & Safety	Annual training hours per employee*	See Benchmarking Data, Section 2.6 above	2.2.1.6
Personnel & Safety	Employee Health and Safety Severity Rate	Injury hours per 100 Full Time Employees (MMSD and Veolia)	2.2.1.6

TABLE 2-3: CONVEYANCE PERFORMANCE MEASURES

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Performance	Number of wet weather CSO events	Annual number of Wet Weather CSO events	2.2.2.1
System Performance	Ratio of unused volume of the ISS to the wet weather CSO volume for each event	Event volume of Wet Weather CSOs, Maximum Event volume remaining in ISS (432 total). This does not include the Northwest Relief Sewer because that is for SS).	2.2.2.1
System Performance	Wet Weather Peak Flow Management Plan remains active	Yes/No	2.2.2.2
System Performance	Number of dry weather overflows	Annual number of dry weather overflows (CSO or SSO) with no recorded precipitation within sewersheds contributing to the overflow locations	2.2.2.3
System Performance	Number of wet weather SSOs	Annual number of wet weather SSO events	2.2.2.3

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Performance	Volume of wet weather SSOs	Annual volume of wet weather SSOs	2.2.2.3
System Performance	Number of wet weather SSOs where the event generated flow is less than the WDNR approved level of protection	Annual number of wet weather SSO events where the event generated flow is less than the WDNR approved level of protection	2.2.2.3
System Performance	Volume of wet weather SSOs where the event generated flow is less than the WDNR approved level of protection	Annual volume of wet weather SSOs where the event generated flow is less than the WDNR approved level of protection	2.2.2.3
System Performance	Percent of total flow entering the conveyance system that is captured and treated	Total flow volume delivered to the treatment plants, SSO and CSO volumes	2.2.2.3
System Performance	Number of building backups caused by the loss of capacity or function of a District facility	Annual review of building backup data, determination of those attributable to District facilities	2.2.2.3
System Performance	Regulatory-approved Industrial Waste Pretreatment Program in operation	Yes/No	2.2.2.3

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
Asset Management	Number of rain barrels distributed by the District	Number of barrels sold	2.2.2.1
Asset Management	Number of gallons of green infrastructure capacity in the planning area	Grand total captured less excluded Greenseams amount	2.2.2.1
Asset Management	Percent completion of post-overflow review process within one year	Total number of overflow events and system failures, number of reviews completed	2.2.2.3
Asset Management	Number of conveyance construction project updates to the GIS	Number of completed conveyance construction projects updated in GIS. Includes whole conveyance projects. Does not include changes to attributes of existing assets.	2.2.2.4
Asset Management	Backlog of conveyance construction project updates to the GIS	Number of completed conveyance construction projects not updated in GIS. Includes whole conveyance projects. Does not include changes to attributes of existing assets.	2.2.2.4

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
Asset Management	Percent of conveyance assets with defined condition and management method as documented in the Asset Information Management System	Total number of assets, Total number of assets with defined condition and management method	2.2.2.4
Asset Management	Level of Protection defined and approved by the WDNR for the wastewater system	Yes/No	2.2.2.4
Asset Management	Number of open PM work orders older than 90 days (sewers)	Number of open PM work orders older than 90 days (for sewers)	2.2.2.5
Asset Management	Planned maintenance ratio: hours* (sewers)	Hours of PM, PdM, and CM	2.2.2.5
Asset Management	Planned Maintenance ratio: count (sewers)	Count of PM, PdM and CM	2.2.2.5
Asset Management	Planned maintenance ratio: cost (sewers)	Cost of PM, PdM, and CM	2.2.2.5

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
Asset Management	Number of open PM work orders older than 90 days (conveyance equipment and pump stations)	Number of open PM work orders older than 90 days (conveyance equipment and pump stations)	2.2.2.5
Asset Management	Planned maintenance ratio: hours* (conveyance equipment and pump stations)	Hours of PM, PdM, and CM	2.2.2.5
Asset Management	Planned maintenance ratio: count (conveyance equipment and pump stations)	Count of PM, PdM and CM	2.2.2.5
Asset Management	Planned maintenance ratio: cost (conveyance equipment and pump stations)	Cost of PM, PdM, and CM	2.2.2.5
Asset Management	Conveyance system integrity* [#collection system failures/total miles in collection system]	See Benchmarking Data, Section 2.6 above	2.2.2.5
Capital Program Implementation	Facilities Plan implementation on schedule	Yes/No	2.2.2.4

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Monitoring	Percentage of metersheds where compliance or non-compliance of contributing municipalities has been established		2.2.2.2
System Monitoring	Percent of flow monitors at non-critical sites repaired within 30 consecutive days after problems are identified	Number of non-critical site flow monitors (portable or permanent) with reported repairs taking longer than 30 consecutive days to complete (do not count repairs that require equipment replacement)	2.2.2.6
System Monitoring	Percent of non-critical monitoring sites with less than 30 consecutive days of missing or bad data	Number of non-critical monitoring sites (portable or permanent), with more than one month of missing or bad data	2.2.2.6
System Monitoring	Percent of non-critical monitoring site, rain gauge, and water quality data reviewed for QA within 90 days	Percent of monitoring data reviewed for quality	2.2.2.6

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Monitoring	Percent of flow monitors at critical sites repaired within 5 business days after problems are identified	Number of flow monitors (portable or permanent) with reported repairs at critical sites, number of flow monitor repairs taking longer than 5 days to complete (do not count repairs that require equipment replacement)	2.2.2.6
System Monitoring	Percent of critical monitoring sites with less than 5 business days of missing or bad data	Number of monitoring sites (portable or permanent) at critical sites, Number of monitoring sites with more than one month of missing or bad data	2.2.2.6
System Monitoring	Percent of monitoring sites calibrated [check and adjustment as necessary] annually	Number of permanent monitoring sites, Number of permanent monitoring sites calibrated	2.2.2.6
System Monitoring	Percent of rain gauges calibrated [check and adjustment as necessary] annually	Number of rain gauges, Number of rain gauges calibrated	2.2.2.6

Conveyance Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Monitoring	Percent of critical monitoring site data reviewed for QA within 30 days	Percent of monitoring data reviewed for quality	2.2.2.6
Customer Service	Percent of documented inquiries with a documented response	Number of sewer inquiries received, number of sewer inquiry documentations completed. Sewer inquiries are defined as calls received of building backups, sewage overflows, spills into the system, clogged or collapsed sewer or structure, illegal dumping into the sewer system	2.2.2.7

TABLE 2-4: TREATMENT PERFORMANCE MEASURES

Treatment Functional Area	Measure *indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Performance	Receipt of Gold or Platinum NACWA Peak Performance Award	Yes/No	2.2.3.1
System Performance	Number of in-plant diversions not consistent with permit requirements		2.2.3.1
System Performance	Volume of in-plant diversions not consistent with permit requirements	Flow volume delivered to the treatment plants, Flow volume diverted around secondary treatment. Conditions at time of diversions	2.2.3.1
System Performance	Percent of time effluent Ammonia is in compliance with WPDES permit	Weekly average of the effluent Total Ammonia Nitrogen results (count 7 days for each week out of compliance)	2.2.3.1
System Performance	Percent of time effluent BOD is in compliance with WPDES permit	Weekly and Monthly average of the effluent BOD results (count 7 days for each week out of compliance and 30 days for each month out of compliance)	2.2.3.1

Treatment Functional Area	Measure *indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Performance	Percent of time effluent fecal coliform count is in compliance with WPDES permit	Monthly geometric mean of the fecal coliform count results (count 30 days for each month out of compliance)	2.2.3.1
System Performance	Percent of time effluent Phosphorous is in compliance with WPDES permit	Monthly average of the effluent Total Phosphorous results (count 30 days for each month out of compliance)	2.2.3.1
System Performance	Percent of time effluent TSS is in compliance with WPDES permit	Weekly and Monthly average of the effluent TSS results (count 7 days for each week out of compliance and 30 days for each month out of compliance)	2.2.3.1
System Performance	Volume of SSOs that occurred when treatment plant capacity was below the planned wet weather capacity.	SSO Volume after ISS separate sewer gate closure	2.2.3.2
System Performance	Number of SSO events that occurred when treatment plant capacity was below the planned wet weather capacity.	Number of SSO events occurring after ISS gate closure, event classification (above or below LOP)	2.2.3.2
System Performance	Total mass of biosolids produced.		2.2.3.3

Treatment Functional Area	Measure *indicates the measure is also a benchmark	Data Requirements	Reference Objective
System Performance	Percent of produced biosolids that are beneficially reused	Biosolids produced, Biosolids sent to landfill	2.2.3.3
Asset Management	Planned wet weather capacity is defined (by the 2020 Facilities Plan) and approved by the WDNR for the Wastewater System	Yes/No	2.2.3.4
Asset Management	Percent of treatment plant assets with defined condition and management method as documented in the Asset Information Management System	Number of assets, number of assets with defined condition and management method	2.2.3.4
Asset Management	Number of CM work orders older than 90 days (treatment plant equipment)	Number of CM work orders older than 90 days	2.2.3.5
Asset Management	Number of PM work orders older than 90 days (plant equipment)	Number of PM work orders for plant equipment older than 90 days	2.2.3.5
Asset Management	Planned maintenance ratio: count of work orders	# of PM, PdM, and CM WOs	2.2.3.5

Treatment Functional Area	Measure *indicates the measure is also a benchmark	Data Requirements	Reference Objective
Asset Management	Planned maintenance ratio: hours*	Hours of PM, PdM, and CM	2.2.3.5
Asset Management	Planned maintenance ratio: cost	Cost of PM, PdM, and CM	2.2.3.5
Asset Management	Number of outstanding open CM tasks	Number of open CM tasks not completed after 90 days	2.2.3.5
Asset Management	Number of outstanding open PM tasks	Number of open PM tasks not completed after 90 days	2.2.3.5
Asset Management	O&M cost per MG treated*	See Benchmarking Data, Section 2.6 above	2.2.3.5
Capital Program Implementation	Facilities Plan implementation on schedule for treatment plant studies and projects	Yes/No	2.2.3.4

TABLE 2-5: WATERCOURSE PERFORMANCE MEASURES

Watercourse Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
Capital Program Implementation	Annual number of habitable structures removed from the one-percent probability floodplain		2.2.4.1
System Conservation	Area of property protected/preserved through District ownership or conservation easement	Purchases and easements obtained through Conservation Fund and Greenseams	2.2.4.2
System Conservation	Percent of stormwater management plans reviewed within the timeframe allowed	Number of stormwater management plans submitted, number of stormwater management plans reviewed with allowable timeframe	2.2.4.2
System Conservation	Number of watercourse obstructions removed that had potential to add new structures to the 1% probability floodplain		2.2.4.2
System Conservation	Percent of jurisdictional watercourse with non-concrete streambeds	Total length of jurisdictional watercourse, length of jurisdictional watercourse with natural streambeds	2.2.4.5

Watercourse Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
Asset Management	Number of presentations by District personnel that included information water quality	Number of presentations	2.2.4.2
Asset Management	Number of jurisdictional watercourse construction project updates to the GIS	Number of watercourse construction project updates to the GIS. Includes whole projects. Does not include revision of attributes to existing assets.	2.2.4.3
Asset Management	Backlog of jurisdictional watercourse construction project updates to the GIS	Number of completed watercourse construction projects not entered in watercourse GIS. Includes only whole projects. Does not include revision of attributes to existing assets.	2.2.4.3
Asset Management	Percent of watercourse assets with defined condition and management method documented in the Asset Information Management System	Number of assets, number of assets with defined condition and management method	2.2.4.3

Watercourse Functional Area	Measure * indicates the measure is also a benchmark	Data Requirements	Reference Objective
Asset Management	Percent of scheduled watercourse asset inspections completed	Number of scheduled watercourse asset inspections completed	2.2.4.4
Asset Management	Percent of scheduled watercourse asset criticality assessments completed	Number of scheduled watercourse asset criticality assessments completed	2.2.4.4
Customer Service	Percent inquiry documentation completed	Number of watercourse inquiries received, number of watercourse inquiry documentations completed. Watercourse inquiries include debris in channel and flooding complaints. Does not include vegetation management or graffiti.	2.2.4.6

2.8 REPORTING METHODS FOR CMOM COMPLIANCE REVIEWS

This seventh section of the Management Plan discusses the means for documenting and reporting on CMOM compliance. The purpose of this section is to have defined methods for communicating activities, accomplishment and changes to the CMOM program to stakeholders, including regulatory authorities. The District will employ three methods of formal reporting regarding implementation and execution of the CMOM program. The three methods are the Compliance Maintenance Annual Report (CMAR), the CMOM Program Annual Report and the CMOM Program Audit Report. Each of these is discussed below.

2.8.1 COMPLIANCE MAINTENANCE ANNUAL REPORT

The District is required by its WPDES permit from the WDNR to submit an annual CMAR. This submittal includes a specific section regarding the CMOM program documentation. However, it also includes more specific data regarding treatment plant flows, plant effluent quality, biosolids quality and disposal, plant maintenance, collection system maintenance, collection system overflows, and financial management. All of these items are related to the goals and performance measures included in the District CMOM program. Although the CMAR does not contain reporting for every area, it does act as an annual summary of the important goals and measures.

2.8.2 CMOM PROGRAM ANNUAL REPORT

The District will prepare a CMOM Program Annual Report each calendar year. This annual report will encompass the entire District CMOM program. The report will have short discussions regarding meeting of goals and objectives, and also have supporting data tabulated and analyzed.

Further discussion of the annual report is contained in the Communication Plan (Chapter 6, section 6.2.2 of this document).

2.8.3 CMOM PROGRAM AUDIT REPORT

The District will conduct an audit of its CMOM program on a five year cycle. The audit will include the following steps:

1. Reviewing District performance measures
2. Reviewing District benchmarks

3. Reviewing stakeholder input
4. Formation of chapter review teams with cross-divisional representation from the District
5. Completion of an update to the entire CMOM program

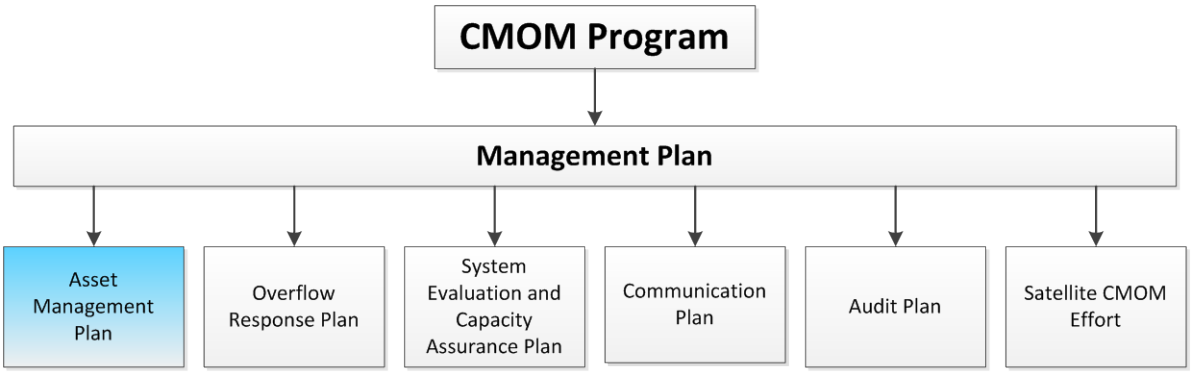
Further discussion of the auditing process is included in the Audit Plan (Chapter 7 of this document).

2.9 MANAGEMENT PLAN UPDATES

The Management Plan will receive annual updates through the annual review of the performance measures and preparation of the CMOM Program Annual Report.

For further information, see the Communication Plan (Chapter 6, section 6.2.2 of this document) and Audit Plan (Chapter 7, section 7.2 of this document).

ASSET MANAGEMENT PROGRAM



Asset Management Program

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3.1 THE ASSET MANAGEMENT PROGRAM

The District Asset Management Program was initially developed as a chapter of the CMOM Program, titled the "Asset Management Plan". The use of "Asset Management Plan" in this context has been identified in quotes to differentiate the original "Plan" from the industry definition of an Asset Management Plan, which is the definition the District will be following in the future. The Asset Management Program has evolved to become a management strategy that is being implemented throughout the organization that impacts all facets of the CMOM Program as well as organizational issues outside the scope of the District CMOM program. This section will provide a description of asset management principles, a brief history of asset management implementation at the District, an overview of the program drivers, the organizational structure to implement asset management, a description of the continuous improvement process being implemented to integrate asset management within the District, and a listing of key program documentation.

3.2 GENERAL ASSET MANAGEMENT PRINCIPLES

There are a number of standards and guides available that describe asset management principles, such as *ISO 55000 – Asset Management – Overview, principles and terminology* (12), *PAS 55 – Asset Management* (13), the Water Environment Research Foundation's (WERF) online tool – Sustainable Infrastructure Management Program Learning Environment (SIMPLE), the *International Infrastructure Management Manual* (14) and *Managing Public Infrastructure Assets to Minimize Cost and Maximize Performance* (15). These standards and guides describe the goals of an asset management program (system), the different components required, and various methods to implement the program. The principles described in these standards and guides were used in the development of the District asset management program and will be continuously implemented as the program evolves.

The key elements of asset management are:

- Taking a life-cycle approach.
- Developing cost-effective management strategies for the long-term.
- Providing a defined level of service and monitoring performance.
- Identifying and managing organizational risks.
- Using the resources of the agency in a sustainable manner.
- Continuously improving AM practices.

Asset management can be defined as "A management strategy by which assets are utilized to provide defined levels of service at the lowest life cycle cost while maintaining a level of risk acceptable to the organization." At the most basic level asset management can be viewed as the means to optimize performance, risk and cost.

Within this definition, there is a great degree of variability as to the approaches that can be taken. Overall, though, it means that a utility must provide a structured approach for gathering, storing and analyzing costs related to the planning, engineering, design, construction, start-up, operations, maintenance, energy use, rehabilitation, refurbishment and disposal of its assets. The structured approach is necessary to have the information available when making asset management decisions.

Another way of stating this is to say that an asset management program is a defined system to improve the management of asset life-cycle costs such that:

- There are defined and accepted Levels of Service (LOS) with associated metrics that are monitored to track performance against LOS (LOS criteria are aligned with the overall organizational goals)
- There are systems and processes to identify the likelihood of failure (LOF) and consequence of failure (COF) for systems and assets to understand the level of risk to the organization
- There are standard procedures for approving asset spending that evaluate projects and expenses consistently against LOS and risk criteria and incorporate life cycle costs
- The system organizes and allows easy visual access to all asset physical data (i.e. identification, location, dimensions, material, connectivity, construction method, environment) and required cost data necessary for making decisions regarding asset spending
- The system provides the ability to forecast planning, design, construction, operating, maintenance, repair, refurbishment, replacement and disposal costs and compare predicted costs to realized costs for improved decision making.
- There is clear communication throughout the organization on the principles of asset management, how the principles will be implemented to achieve organizational goals, and what is each staff members role in achieving the big picture goals of the organization
- The program provides a system to ensure personnel are trained according to documented procedures and that the procedures are regularly audited.

All of these principles are incorporated into the District's asset management program. Because doing things economically is at the core of asset management, some of the

principles are also subject to cost-effectiveness and may be applied to a greater or lesser degree.

3.3 ASSET MANAGEMENT PROGRAM HISTORY

The District Asset Management Program was initiated as a chapter in the CMOM Program that was developed as a requirement of the 2002 Stipulation agreement between the District and the State of Wisconsin. The initial Asset Management Program was titled the "Asset Management Plan" and was developed based on the following:

- Requirements of the 2002 Stipulation
- Guidance from the 2001 USEPA withdrawn SSO Rule
- Asset management principles
- CMOM Program objectives
- Business Process Gap Analysis conducted as part of the CMOM Readiness Review and Implementation Strategy Development (CMOM Strategy) completed in 2005

While all items above were used to develop the program, the 2005 Business Process Gap Analysis provided the most detailed strategies, tasks and general timelines required for program implementation. Therefore the original "Asset Management Plan" was based largely on the 2005 gap analysis. The gap analysis included the following items:

- Evaluated District performance in twelve major areas and 81 specific topic areas related to AM.
- Compared District performance in each area to "best practices" as provided by the consulting team.
- Reviewed current performance and defined desired performance in each area, calibrating the vision against what seems reasonably achievable over the next five to ten years.
- Prioritized the major AM areas in terms of "immediate," "near-term," and "long-term."

The "Asset Management Plan" included in the original CMOM documentation, completed in June 2007, identified specific items to be completed to close the identified gaps. Items were broken down into the following general timelines for completion.

Immediate/Foundation Work
Near Term
Long Term

Within each general timeline listed above there were specific areas of focus that were based on the gap analysis categories developed (e.g. Vision and Support, Asset Knowledge, Asset Condition Monitoring, etc…). Each area of focus had corresponding objectives and tactics to be implemented to achieve the specific goals of the area and close the gap. Progress in achieving the identified objectives and tactics was documented in the CMOM Annual Reports provided to the WDNR. From 2007 through 2012 the Immediate/Foundation Work goals were largely completed and many of the Near Term goals, specifically in the conveyance system, were completed.

In 2013 the District identified the need to perform another gap analysis to identify progress of the Asset Management Program and determine the current gaps required to be closed. After evaluating several different gap analysis tools that could be used, including the original 2005 gap analysis format developed in the CMOM Strategic Plan, the SAM-GAP tool developed by the Water Environment Research Foundation (WERF) was selected. It was determined that WERF's SAM-GAP tool was the most applicable since it has been rigorously tested over time, is updated against current best practices, is industry specific (water and wastewater) and allows performance to be easily updated over time using a web based tool. The 2005 gap analysis was not chosen since it was based on the 2002 International Infrastructure Management Manual so it is not current for best practices and was developed by a consultant specifically for the District so it has not been tested across the industry and does not provide comparison against similar organizations.

The 2013 gap analysis results provided recommendations to be implemented in seven core organizational quality elements to improve the Asset Management Program. The seven core elements are listed below.

- Processes and Practices
- Information Systems
- Data and Knowledge
- Commercial Tactics
- Organizational Issues
- People Issues
- Asset Management Plans

Recommendations of the gap analysis were reviewed and used to develop the 2014 Asset Management Strategy (Appendix 3-1)[9] that identified the specific areas of improvement to be addressed in 2014. Recommendations from the 2013 gap analysis and the corresponding improvements identified to be implemented have helped establish the direction of the asset management program. Significant improvements to the program that have been identified include:

- Development of a Commission level policy defining Asset Management
- Development of an Asset Management Strategy document to define continuous improvement tasks required
- Creation of Asset Management Plans specific to District service areas

The specifics of these improvements are defined in the following sections.

3.4 PROGRAM DRIVERS

One of the key recommendations of the 2013 gap analysis was to review and improve the organization's commitment to asset management by documenting the commitment in policies, mission statements and business plans. Since the District views asset management as an overall management strategy to be implemented throughout the entire organization a Commission level policy was created defining the District's commitment to asset management. Commission Policy 1-44.01 – Asset Management was adopted on April 28, 2014. This policy serves as the organizational driver of the asset management program and identifies the District's commitment to the program from the Commission level down through the organization.

The District Commission Policy establishes the guidelines by which asset management will be implemented within the organization but the true drivers of the asset management program are the internal organizational goals, legal and regulatory requirements and external stakeholder needs.

[9] The Asset Management Strategy attachments are not included in this document due to their size. The documents can be provided upon request.

3.4.1 COMMISSION POLICY

Commission Policy 1-44.01 – Asset Management describes the high level goals of the program, describes general staff requirements to support asset management and identifies key program documentation to be developed and maintained. Commitments identified in the policy are listed below.

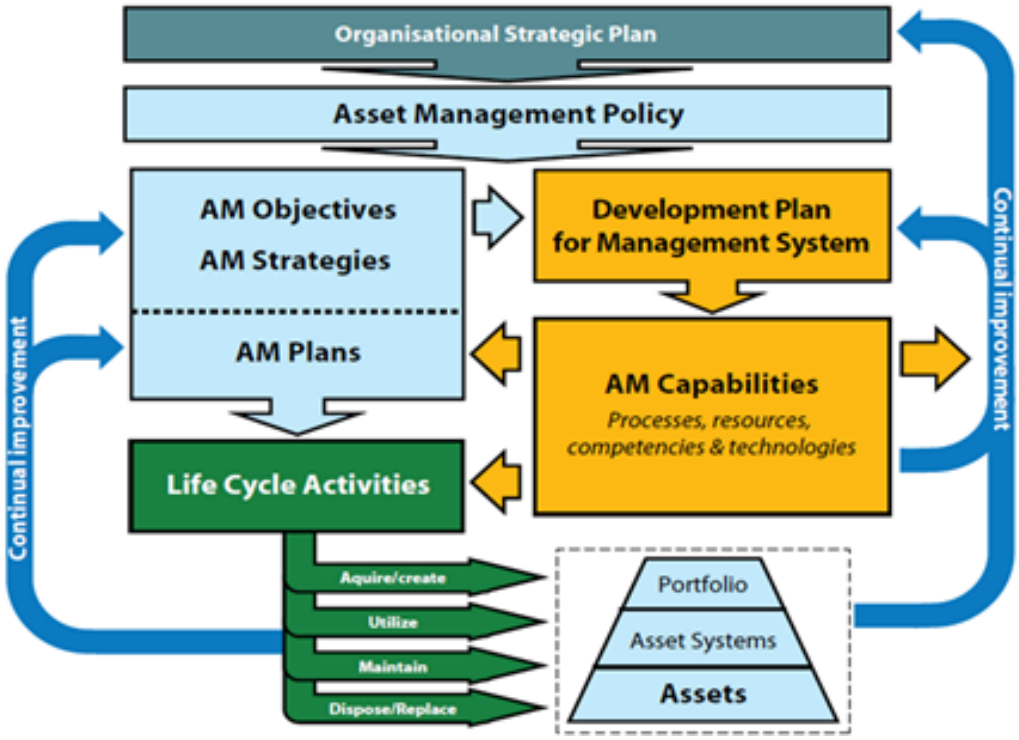
Commitments:

The District is committed to continuous improvement in implementing sustainable Asset Management best practices throughout the organization following the guidelines listed below.

1. MMSD will continue to incorporate sustainable Asset Management principles throughout the organization to facilitate achievement of strategic goals, meet the environmental, social and economic needs of District stakeholders and comply with all legal and regulatory requirements.
2. MMSD will continue to implement an Asset Management Program framework that identifies overall program objectives, processes and procedures, and staff roles and responsibilities.
3. MMSD will continue to support and staff the Asset Management Executive Steering Committee (AMESC) and the Asset Management Team (AMT) to ensure strategic level Asset Management goals are effectively translated into operational plans.
4. MMSD will annually review and if necessary update the Asset Management Strategy document that defines goals, tasks and timelines for implementing Asset Management improvement processes and projects.
5. MMSD will prepare Asset Management Plans to identify the business case for long term expenditure forecasts and evaluate the plans on a minimum five year interval to determine if revisions are required.
6. MMSD will report annually to the Commission on progress of the Asset Management Program and Strategy.

An example of an asset management framework diagram that visually describes the interaction of the AM Policy, AM Strategy, AM Plans and continuous improvement process is included in Figure 3-1 below.

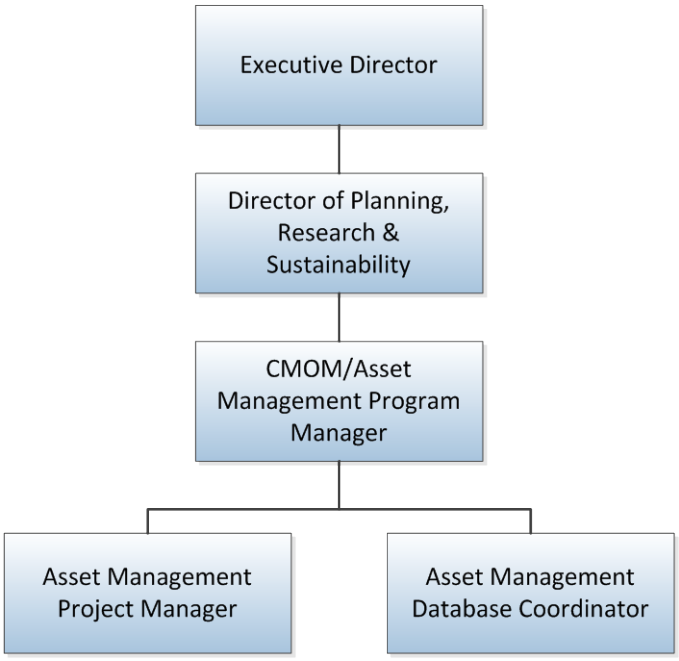
FIGURE 3-1: ASSET MANAGEMENT FRAMEWORK DIAGRAM



3.5 ORGANIZATIONAL STRUCTURE

The District created the position of CMOM/Asset Management Program Manager in 2006 and has funded the position since that time. The position reports directly to the Director of Planning, Research and Sustainability. The duties of the CMOM/Asset Management Program Manager include implementation of asset management principles throughout the organization and management of the day-to-day program operations. The position currently oversees two positions dedicated to asset management, the Asset Management Project Manager and the Asset Management Database Coordinator. The diagram in Figure 3-2 below indicates the hierarchy of asset management staff.

FIGURE 3-2: DISTRICT ASSET MANAGEMENT STAFF HIERARCHY



However, since the principles of asset management require organization wide commitment and participation the District has developed two cross-divisional teams to ensure asset management principles are integrated throughout the organization. The CMOM/Asset Management Program Manager leads both teams to ensure asset management principles are consistently understood and applied. Therefore even though the asset management department and staff are located within the Planning, Research and Sustainability Division the principles of asset management are well communicated throughout the organization and input is received on program direction from multiple divisions and levels of the organization. The Asset Management Executive Steering Committee (AMESC) is comprised of executive level staff from multiple divisions throughout the organization. A listing of staff positions included on the AMESC is included in Table 3-1. The duties of the AMESC include review of high level asset management program documents and program budgetary and staffing decisions. The AMESC provides executive level guidance of the strategic level program direction.

TABLE 3-1: AMESC STAFF POSITIONS

Division or Department	District Title
Office of the Executive Director	Executive Director
Planning, Research & Sustainability	Director of Planning, Research & Sustainability
Technical Services	Director of Technical Services
Water Quality Protection	Director of Water Quality Protection
Finance	Controller-Treasurer
Information Technology	Information Systems Manager
Contract Compliance	Contract Compliance Manager
Office of Management & Budget	Budget Manager
Agency Services	Agency Services Manager
Planning, Research & Sustainability	CMOM/Asset Management Program Manager

The Asset Management Team (AMT) is comprised of various management and non-management level staff from multiple divisions of the organization as well as staff from the operations contractor. A listing of staff positions included on the AMT is included in Table 3-2. The duties of the AMT include development and updates to the Asset Management Strategy (document that lists detailed tasks to be completed for continuous improvement), communication of program goals and progress to their respective direct reports and co-workers, and assistance with implementation of tasks identified in the Asset Management Strategy. The AMT serves to implement the strategic level program direction from the AMESC into operational level actions.

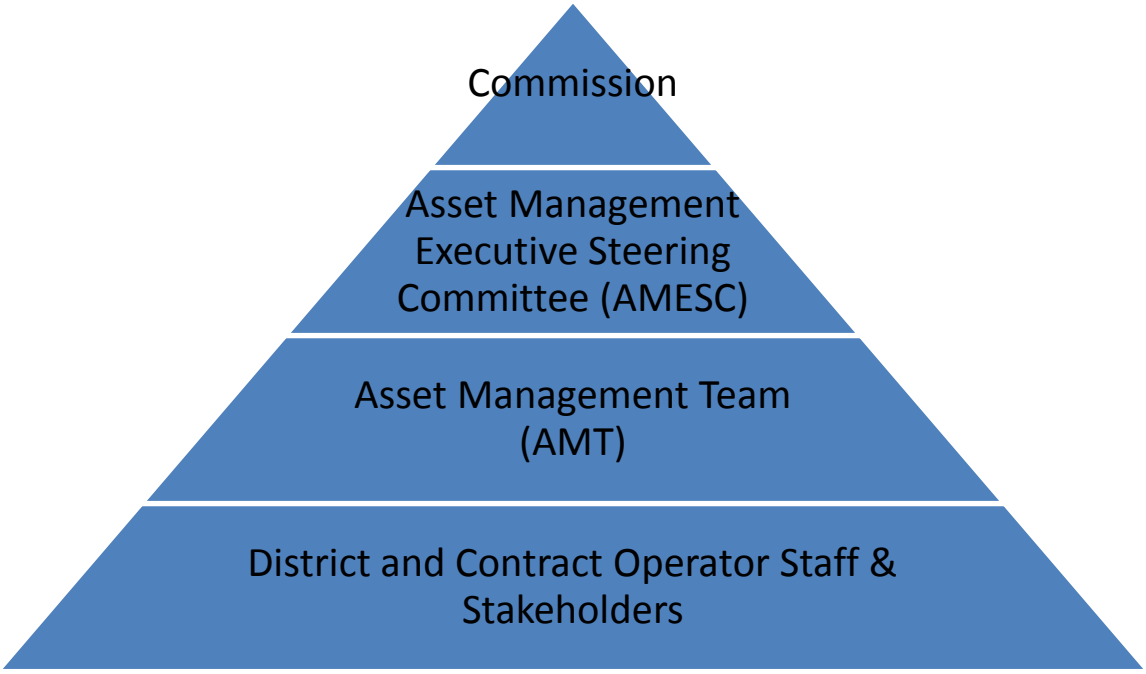
TABLE 3-2: AMT STAFF POSITIONS

Functional Area	Organization/Division
Asset Management (2)	MMSD/Planning, Research & Sustainability
Planning (2)	MMSD/Planning, Research & Sustainability
Contract Compliance	MMSD/Technical Services
Engineering	MMSD/Technical Services
Construction	MMSD/Technical Services
Capital Program Business Administration (2)	MMSD/Technical Services
Geographic Information Services	MMSD/Technical Services
Accounting	MMSD/Finance

Budget	MMSD/Finance
Water Quality/Monitoring (2)	MMSD/Water Quality Protection
Water Quality/Central Lab	MMSD/Water Quality Protection
Information Technology (2)	MMSD/Office of the Executive Director
Operations & Maintenance (5)	Contract Operator/Various Departments

A diagram is included in Figure 3-3 below indicating the hierarchy of asset management activity within the District. The organizational structure allows for strategic level program direction to flow from the Commission down throughout the organization. Equally important, it provides the opportunity for data and information from District and contract operations staff and stakeholders to flow up throughout the organization to assist management in making decisions based on staff knowledge and asset data.

FIGURE 3-3: DISTRICT ASSET MANAGEMENT ACTIVITY HIERARCHY



3.6 CONTINUOUS IMPROVEMENT PROCESS

A key principle of asset management is the integration of continuous improvement processes within an organization. The first step in the improvement process is to understand the current status of the organization. A gap analysis is a useful tool to

identify an organizations current status against a desired status or benchmark status of other organizations. The 2013 gap analysis was performed to identify areas of improvement for the District asset management program. This was the second gap analysis performed by the District since the initiation of the asset management program, with the original gap analysis performed in 2005 as part of the CMOM Strategic Plan. The District intends to continue the process of evaluating program status against the benchmark status of other water and wastewater organizations through WERF's SAM-GAP tool, which was used in the 2013 gap analysis. The schedule for future gap analyses has not been defined but will likely be performed on approximately a five year interval.

The gap analysis process provides information on organizational gaps and recommendations for improvements, but the key to implementing a continuous improvement process is reviewing and prioritizing recommendations and identifying specific tasks, timelines and resources to close the gaps and implement recommendations. The District has identified the Asset Management Strategy as the tool to identify and prioritize tasks, establish timelines and identify resources required for continuous improvement of the asset management program. The original Asset Management Strategy was developed from the 2013 gap analysis and identified the priority tasks to be addressed in 2014. The Asset Management Strategy has recently been expanded to include tasks planned for 2015 and will be developed for future years by the end of 2014. The Strategy is viewed as a fluid plan that will evolve along with the District asset management needs and organizational priorities. Therefore the Strategy has been integrated onto the District's internal SharePoint site to provide staff access to the current version and to allow regular updates on task status.

3.7 ASSET MANAGEMENT PLANS

The initial CMOM Program documentation developed in 2007 included a section titled "Asset Management Plan" that described the overall goals, objectives and strategies to implement asset management within the District. Since that time the District has revised the terminology of our asset management documentation to better align with industry standards. The information included in the 2007 "Asset Management Plan" is now identified within the District's Asset Management Strategy. The term Asset Management Plan (AMP) now represents a document that will developed for a specific system of assets. The overall purpose of the AMP will be to identify the long term investments required to provide a defined level of service delivered by the assets and minimize the risk and consequence of asset failure. To date, the District has not

developed an AMP that fits the industry standard. However the District has identified criteria to be followed in developing AMP's as deliverables of the 2050 Facilities Plan that will begin planning work in 2014, with planned completion in late 2017. The District has determined AMP's will be developed for the following service areas.

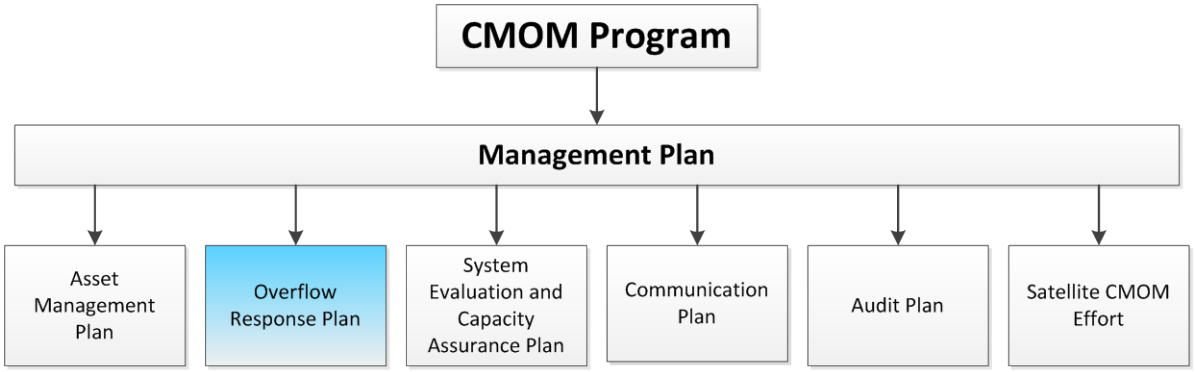
- Conveyance and Storage Systems
- Water Reclamation Facilities and Biosolids
- Watercourses
- Green Infrastructure
- Administrative Facilities

Each AMP will follow the nine step process listed below to develop costs for recommended facilities, programs, operational procedures and policies to meet the District needs through the 2050 planning horizon.

1. Identify Desired Service Levels
2. Develop Demand Forecasts
3. Define Performance Measures, Establish Targets and Assess Current Performance
4. Identify Likely Failure Modes and Timelines
5. Determine Business Risk (Likelihood of Failure and Consequence of Failure)
6. Develop Alternatives to Meet Service Levels
7. Optimize Capital and O&M Investments
8. Identify Recommended Alternatives
9. Identify District Data, Technology and Knowledge Management Improvements

Each AMP will be developed in a format that allows the District to use the information as a living document to be updated and improved as additional data and knowledge is obtained. It is anticipated that the initial AMP's will be lacking some data and information since this will be a new process. Therefore the recommendations from step 9 above will assist with improvements to the data, technology and knowledge management to improve future versions of AMP's.

OVERFLOW RESPONSE PLAN



Overflow Response Plan

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4.1 OVERFLOW RESPONSE PLAN

The overflow response plan (ORP) is driven by the requirements set forth under s. NR 210-23(4)(f) of the Wisconsin Administrative Code. The ORP provides documentation of the methods in place to ensure that the District is aware of, responds to, and provides notification of all overflows of sewage from District facilities. To this end, the ORP is divided into sections on overflow identification (4.2), overflow response (4.3), and notification (4.4). In addition to these primary activities, the ORP documents the training requirements to ensure the plan is executed properly (4.5) and regularly updated (4.6). The District is including bypassing[10] and combined sewer wet weather flow treatment[11] at the treatment plants in the identification and notification portions of the ORP to document the process.

4.2 OVERFLOW IDENTIFICATION

Overflows and diversions are usually at locations that were constructed to protect the system in separate sanitary sewer systems, in combined sewer systems, and at the treatment plants. The District presently monitors all of these sites. In addition to this, the District distributes phone lists to the satellite system owners so they can notify the District in the event of an overflow at a location other than a constructed site. Lastly, the District maintains a 24-hour number so that the public can call in an overflow or other issue with the sewerage system. Each of these items is discussed in further detail below.

4.2.1 IDENTIFICATION BY THE DISTRICT

The District identifies overflows through its extensive monitoring capabilities and through field investigations that occur during and after wet weather events. These are discussed for constructed sanitary sewer outfalls, combined sewer outfalls, and at treatment plants below.

[10] Bypass is defined by Wis. Adm. Code, sec. NR 205.03 (5)

[11] Combined sewer wet weather treatment process is defined by the District's SPDES permit, sec. 2.2.3

4.2.1.1 SEPARATE SEWER OUTFALLS

There are 24 separate sewer outfall (SSO) points listed in the District's current Wisconsin Pollutant Discharge Elimination System (WPDES) permit and are also listed in Appendix 4-1 of this document. Since the writing of the last permit, one of the SSO points (237) was bulkheaded and cannot actually overflow. This point will be permanently abandoned in the future. There are therefore, 23 potentially active SSO points in the District system that must be monitored.

These 23 potentially active SSO points can either operate by gravity, as the water level in the sewer rises, or with the aid of pumps. Presently 17 SSO points are continuously monitored by the Supervisory Control and Data Acquisition (SCADA) system and have the information relayed to the Central Control System (CCS), which is staffed 24 hours per day, every day of the year. These are indicated in Appendix 4-1 by a Yes in the current SCADA column.

Of the remaining six sites, four have portable meters installed in the outfall pipes and are checked by District field crews after wet weather events to determine if an overflow occurred. These are indicated in Appendix 4-1 by a Yes in the Current Portable column. The other two sites have gates that must be manually activated (214 and 244).

Therefore, all of the 23 active SSO points are monitored. Some will be monitored in real-time by the CCS, some will be monitored with portable metering that is checked by field crews, and some have to be manually activated.

4.2.1.2 COMBINED SEWER OUTFALLS

There are 115 combined sewer outfall points listed in the District's WPDES permit, as shown in Appendix 4-2. For the purposes here, the sewers that divert flow from one combined sewer system to another or to a diversion structure are called combined sewer overflows. The combined sewer segments that lead to a river or the lake and allow sewage out of the system are called combined sewer outfalls. All 115 points are potentially active and must be monitored.

One-hundred five of the combined sewer outfalls are hydraulically connected to one of 20 drop shaft systems that allow combined sewage into the Inline Storage System (ISS). The water level is monitored continuously in all of the drop shafts and the associated junction chamber and is relayed to the CCS. By monitoring the water level in the junction chamber and also monitoring river and lake levels, it will be known if sewage is

escaping from the system through a combined sewer outfall. In addition, combined sewer outfalls are activated when the gates in the drop shafts are closed to combined sewage to reserve room for separate sewage. The CCS operator receives a notification when the gates to the combined sewer system are shut. If there is intervention, then the procedure followed requires deliberate actions involving District or contract operator personnel. In either case District staff will be aware that an overflow is occurring.

Of the other ten combined sewer outfalls, one is the Emergency Wastewater Exit (061), which is continuously monitored for water level. The other nine (010, 015, 016, 018, 019, 197, 230, 260 and 262) combined sewer outfalls are all for relief of the District's Metropolitan Interceptor Sewer (MIS) system. These sites are all presently monitored for water level, either as an individual site in the SCADA system, by nearby SCADA sites, with portable meters, with surcharge level indicators, or a combination of the above. The portable meters and surcharge level indicators are checked after rain events by District monitoring staff, as discussed below in section 4.3.2.

4.2.1.3 TREATMENT PLANTS

Manually operated diversion gates at the South Shore Water Reclamation Facility (SSWRF) and Jones Island Water Reclamation Facility (JIWRF) are locked. Opening the gates must be initiated by the District and requires a supervisor to remove the locks. Flow diversions resulting from overflow of weirs are alarmed both on a local level and at the CCS. Automatic diversion gates and flow resulting from opening any of the automated gates is continuously monitored via the plant wide SCADA systems.

The District is also aware of when bypassing or combined sewer wet weather flow treatment are occurring. They are either initiated by the District or staff is notified through the SCADA systems.

Therefore, contract operator staff should be immediately aware of all events, provided SOPs are followed and monitoring equipment is functioning properly.

4.2.2 IDENTIFICATION BY SATELLITE SYSTEM OWNERS

The satellite sewer system owners that discharge into the District system are annually provided a listing of District contacts for specific problems and the 24 hour number for reporting emergency problems. In addition, they are asked to verify the contact names

and numbers that the District has for response in their systems and provide updated information if it should be changed (Appendix 4-3).

There are times when satellite system operators are performing work or investigating problems when they notice an issue caused by the MIS system. The purpose of providing District contact information to satellite system operators is so they can contact the appropriate party at these times.

4.2.3 IDENTIFICATION BY THE PUBLIC

The District's contract operator is required to staff a 24-hour telephone number that is listed in the telephone book for the Milwaukee Metropolitan Sewerage District. District customers and the general public can call the main number during work hours or the 24-hour number during off-hours.

The District's main number is answered by a receptionist between the hours of 7:30am and 4:30pm, Monday through Friday excluding holidays. The receptionist has a District Situational Contact List of issues that have come up in the past and where the call should be directed for each of those issues (Appendix 4-4). During off hours, the automated phone system will provide a caller the 24-hour number for District-related emergencies or a municipality contact number.

4.3 OVERFLOW RESPONSE

The response of the District and its contract operator to a possible overflow includes four parts.

1. Receive and document the information and direct it to the proper personnel.
2. Confirm the overflow is District responsibility.
3. Respond to the possible overflow.
4. Complete an analysis of the overflow.

Each of these is discussed below. The process of identification, response and notification is also shown graphically on the chart provided in Appendix 4-5.

4.3.1 INFORMATION RECEIPT

Calls received by the District operator regarding possible overflows are routed to the 24-hour call center (CCS) maintained by the contract operator. However, some calls related to overflows will also be received by other District staff. Whether District staff or contract operator staff is the primary contact, the procedure is the same: The primary

contact makes further contacts with District and contract operator staff, ensures a proper response, provides feedback and documents the issue and actions taken.

If the contract operator receives: 1) A call from the public through the 24-hour telephone line; 2) A call from District staff; 3) A notification indicating that there is a possible overflow from the conveyance system; or 4) A notification of a diversion at the treatment plant; the CCS Operator will begin the receipt and response process. The CCS operator records the necessary information on the "CCS Overflows/Bypasses" form (Appendix 4-6) and performs notifications according to District procedure MON-SPVS-070 (Appendix 4-7). The CCS Operator contacts the MMSD Field Monitoring Supervisor or Water Quality Manager and the contract operator Conveyance Manager. The CCS Overflows/Bypasses form is emailed to the appropriate distribution list.

If the overflow notice comes in through a phone call, the following information is collected from the caller:

- Location and other information enabling a field crew to quickly locate the problem
- Description/Observations (e.g. water flowing out of pipe, bubbling out of manhole)
- Date and time of observation, date and time of call
- Caller's name and phone number (for providing feedback)

Issues that are not related to overflows that are phoned in to either District or contract operator staff are documented on Request for Assistance (RFA) forms (Appendix 4-8) and are considered separately for the purposes of the Overflow Response Plan.

4.3.2 RESPONSE PROCEDURES

After the information regarding a possible overflow or other potential problem in the conveyance system is received, the contract operator follows their procedures documented in their Sewer Overflow Response Plan (SORP). The CCS operator may direct control of the issue to the conveyance system manager or on-call supervisor depending on the issue. The person in charge then directs the response, which may include calling in staff, securing emergency resources, securing the site, stopping, containing or mitigating the overflow, and documenting the incident. In addition, the contract operator may complete a Request for Assistance Form and communicate with District staff during an incident to ensure the response is appropriate. If the person in charge determines that the situation is an emergency, the Emergency Response Plan is implemented, which includes an incident command system and procedures for

responding to natural disasters, spills into the system, power loss, and other emergencies.

In addition to the contract operator's response, District staff performs some field work. The District work includes field checks to confirm possible overflows, collecting samples where required by the WPDES permit and collecting monitoring data that is necessary for determining the extent of the overflow. The District has standard operating procedure MON-SPVS-060 (Appendix 4-9) in place that describes the procedures and data to be collected by District staff for various wet weather events.

4.3.3 OVERFLOW ANALYSIS

For each overflow, a storm event summary is prepared and reviewed by the District's contract operator. District procedure SOC-CA-01 (Appendix 4-10) outlines the requirements of the Storm Event Summary and review procedure. In addition, a review may be done under the direction of the District's Technical Services Division Director to determine if conditions warrant a detailed analysis of the overflow. The main issues reviewed are: 1) Is there a pending project to address any known problems in the area; 2) Is this a recurring overflow; 3) What was the cause of the overflow; and 4) What steps can be taken to reduce the risk of a similar overflow? If there is a project pending, the analysis will focus on whether the proposed project would have eliminated the overflow. If there is not, the analysis will focus on identifying all details of the cause of the overflow and possible solutions.

The analysis, generally termed a root cause analysis (RCA), is used for overflows, possible overflows, failures and other unusual events. The analysis includes an evaluation of the overflow, system, precipitation, operations and maintenance details as necessary.

4.4 OVERFLOW NOTIFICATION

The District has a defined procedure for notifying various parties when there is a possible overflow, a confirmed overflow, bypassing, or combined sewer wet weather flow treatment. The process of notification is discussed below and also shown graphically on the chart provided in Appendix 4-5.

4.4.1 PUBLIC NOTIFICATION

The District's Public Information Manager is informed of District initiated overflows directly by the Executive Director. In addition, the e-mail that is sent by the contract operator (per 4.3.1 above) will be received by the District's Public Information Manager in the Office of the Executive Director. The Public Information Manager then takes the following actions:

1) Places a notice on the District's publicly accessible weather center site (http://www.mmsd.com/weather/weather-center) for possible and confirmed overflows.
2) Issues a news release and places it on the District's public web site (http://www.mmsd.com/mmsd-news) for confirmed overflows once the 5 day notification letter to the WDNR is completed.
3) Notifies the media for confirmed overflows.

4.4.2 HEALTH DEPARTMENT NOTIFICATION

The City of Milwaukee Health Department is notified via the original e-mail from the contract operator (per section 4.3.1 above) for confirmed overflows and when the combined sewer overflow (CSO) gates close (see Appendix 4-6).

4.4.3 WATER TREATMENT PLANT NOTIFICATION

The Water Treatment Plants are notified via the original e-mail from the contract operator (per section 4.3.1 above) for confirmed overflows and when the CSO gates close (see Appendix 4-6).

4.4.4 PERMIT REQUIRED NOTIFICATION

The WPDES administrator at the WDNR is notified via the original e-mail from the contract operator (per section 4.3.1 above) for confirmed overflows, CSO gate closure, bypasses and combined sewer wet weather flow treatment (see Appendix 4-6). A letter providing detail for each specific overflow is sent to the WDNR within five days after the overflow. A quarterly report is also submitted that summarizes all of the overflows that occurred in the quarter and is considered the final documentation of the overflows. The Compliance Maintenance Annual Report (CMAR) that is submitted by June 30th each year also includes a summary of the overflows that occurred during the past year.

For the permit required notifications (5-day letter, quarterly report, and CMAR), the following information is included for each overflow as applicable:

- Estimated volume
- Estimated duration
- Location
- Reason and contributing circumstances
- Operational actions taken to maximize capture and treatment
- Steps being taken to prevent another discharge
- Precipitation intensity and totals (if caused by precipitation)
- Other relevant information

The District's Water Quality Protection Division Director is responsible for completing and transmitting the 5-day letter, quarterly report and CMAR.

4.5 PLAN AWARENESS TRAINING

Awareness training will be conducted with major plan updates or as necessary as determined by the CMOM Program manager. The training will review the responsibilities of personnel at the District and the contract operator and highlight the changes that have been made.

4.6 OVERFLOW RESPONSE PLAN UPDATES

There will be a periodic review of responses to overflows, failures and other emergencies. The review will be performed by appropriate staff, as determined by the CMOM Program manager.

There will be an annual review of the contract operator's Emergency Action Plan or Overflow Response Plan (required in the operation and maintenance (O&M) contract agreement). The review will be performed by the Office of Contract Compliance and the CMOM Program manager.

The CMOM Program manager will determine the appropriate staff to review the following, as major changes occur:

- Responses to and notifications of overflows, failures and other emergencies
- Issues encountered that affected timely response and notification
- Methods of addressing the issues
- Implementation of the methods

Based on review results, the CMOM Program manager will determine the appropriate timeframe to complete any action items.

The documentation of changes to the ORP will be included in the CMOM Program Annual Report, which will be submitted by June 30th of each year.

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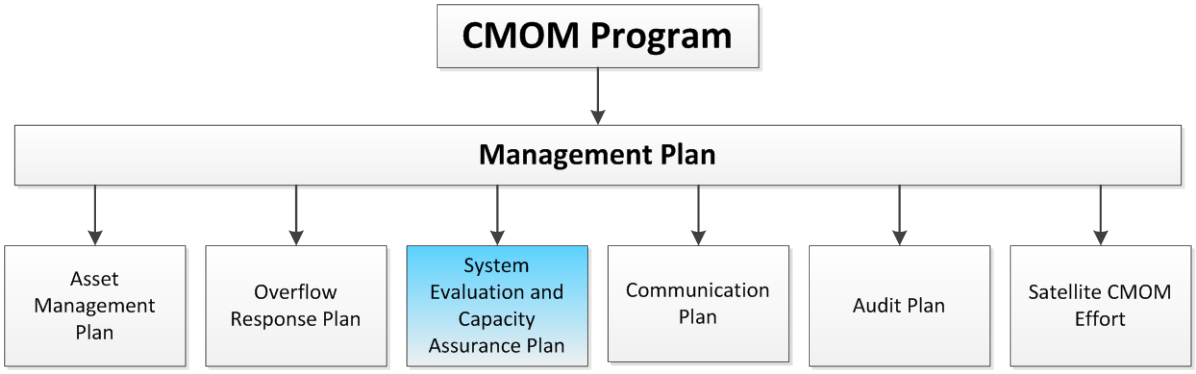
SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN



System Evaluation and Capacity Assurance Plan

5.1 System Evaluation and Capacity Assurance Plan
5.2 Conveyance System
5.3 Wastewater Treatment Systems
5.4 Watercourse Systems

Each section generally contains the following:

- System Description
- Level of Protection
- Generation of Flow and Loadings
- Modeling of the System response to Flow and Loadings
- Identification of Deficiencies
- Prioritization and Implementation Plan

5.5 SECAP Updates

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5.1 SYSTEM EVALUATION AND CAPACITY ASSURANCE PLAN

The District has recognized that CMOM principles apply to all of its service areas. Because of this, the CMOM Program and the System Evaluation and Capacity Assurance Plan (SECAP) chapter include sections for each of the District service areas of Conveyance (5.2), Treatment (5.3), and Watercourse (5.4), and a section on SECAP updates (5.5). For each area, there will be included a section on:

- A description of the system/service area
- The Level of Protection
- Generation of flows and loadings
- Modeling of the system response to flows and loadings
- Identification of deficiencies
- Prioritization and implementation plan

5.2 CONVEYANCE SYSTEM

The MMSD conveyance system serves 29 satellite sanitary and combined sewer system owners (28 municipalities plus Milwaukee County) in the counties of Milwaukee, Ozaukee, Washington, Waukesha and Racine. The MMSD service area is largely developed and will not require significant expansion of facilities to serve new areas. New facilities are generally constructed to eliminate conveyance restrictions, reduce overflows and replace aging facilities.

5.2.1 SYSTEM DESCRIPTION

The MMSD conveyance system consists of the Metropolitan Interceptor Sewer (MIS) system, Near Surface Collector (NSC) system, Inline Storage System (ISS) and the Combined Sewer Outfall system. The MIS system collects flow from both combined sewers and separate sanitary sewers and conveys it to the MMSD wastewater treatment plants. The NSC system collects flow that exceeds the capacity of the MIS system from both the combined and separate sewer service areas and delivers it to drop shafts where the flow enters and is stored in the ISS. Sewage stored in the ISS can be pumped to either of the two MMSD wastewater treatment facilities as capacity is available. The combined sewer outfall system lets flow out of the system and into the rivers and lake during wet weather events that exceed the system capacity.

The Annual Collection Systems Inventory and Performance Report (16) contains a more detailed description of the MMSD conveyance system.

5.2.2 LEVEL OF PROTECTION

The 2020 Facilities Plan – Facilities Plan Report Chapter 9 Appendix F contains the complete discussion of Level of Protection (LOP), including definitions. The discussion includes a review of the LOP used by other wastewater utilities in Wisconsin and the United States, as well as the projected impact to local water quality for different District Levels of Protection. The 2020 Facilities Plan, approved by the WDNR, recommended a 5-year wastewater recurrence interval for the LOP as a criterion for designing and operating the District conveyance, storage and treatment system (Wastewater System). Additionally, the Adaptive Implementation Plan (17) uses actual flow data to determine which projects should move forward in the next five and ten years.

Two related topics that are being addressed are the District's Wet Weather Peak Flow Management Program and Satellite system SECAP requirements. Each is discussed below.

5.2.2.1 WET WEATHER PEAK FLOW MANAGEMENT PROGRAM

The District has implemented the Wet Weather Peak Flow Management Program (WWPFMP), with the input of the Technical Advisory Team (TAT – includes District, satellite, and regulatory representatives). The goal of the WWPFMP is to establish peak wet weather flow standards, outline provisions for the repair of deteriorated sewersheds, and incorporate other activities that will serve to keep I/I (infiltration and inflow) from growing beyond current levels. The enforcement of this program is intended to maintain the District's ability to provide the desired LOP.

The status of the WWPFMP is detailed in the Collection Systems Annual Inventory and Performance Report.

5.2.2.2 SATELLITE SECAP

In 2006, the District completed a limited SECAP for each satellite system to provide information for the 2020 Facilities Plan. The limited SECAP included most sanitary sewer lines 12 inches and larger and any systems with known capacity issues or overflows. The objectives of this effort were to:

- Identify satellite municipality system capacity deficiencies;
- Estimate satellite system bypass volumes and flow rates for a selection of wet weather events that are relevant to the 2020 Facilities Plan analysis; and

- Summarize peak flows delivered to the District's system for the same wet weather conditions.

The first item was used to estimate the cost to the region related to elimination of overflows (whether they are District or satellite). The last two items are the most important relative to the District's SECAP. Understanding additional detail regarding peak flow sources improves the District's ability to plan necessary facilities and implement actions to avoid District overflows. In addition, local overflow volumes were used in water quality calculations.

The District may require a satellite system to prepare a SECAP for a portion of or for their entire sewer system, as described in District Rules, Chapter 3, section 3.105. The limited SECAP that was completed by the District would serve as a starting point for this work.

5.2.3 FLOW GENERATION

The District service area, for the 2020 facilities planning effort, is divided up into sewersheds. For each sewershed, the District has obtained projected land use and population from the communities and from the Southeastern Wisconsin Regional Planning Commission (SEWRPC) for the year 2020. The District uses a two part method for determining total modeled flows into the MIS system. The first part is the sanitary flows which are determined based on population in residential and commercial areas and acreage in industrial areas. The second part is the wet weather related flows, both in combined and sanitary sewer systems. To generate these, the District first uses a model built with the Hydrologic Simulation Program – Fortran (HSPF) to generate surface and sub-surface flows. The surface and sub-surface flows are then input into the District's Flow Forecasting System (FFS), which generates total flow into the MIS system.

The 2020 Facilities Plan – Conveyance Report Chapter 3 contains a more detailed discussion of the generation of wastewater flows in the conveyance system.

5.2.4 HYDRAULIC MODELING

The District has built hydraulic models in two levels of detail of the entire system. The simplest model is called MACRO and is a water balance for estimating total and overflow volumes. This model uses the outputs directly from the HSPF model and is for long-term simulation. The other model is built using MIKE URBAN. This model uses the outputs of

the FFS and is used for single event simulation. It can be used for determining hydraulic grade lines (water levels) and overflow volumes at various locations throughout the system.

The 2020 Facilities Plan – Conveyance Report Chapter 3 contains more detailed discussion of the hydraulic modeling of wastewater flows in the conveyance system.

5.2.5 IDENTIFICATION OF DEFICIENCIES

The conveyance system was modeled with 2020 conditions for a 5-year and 10-year LOP (estimated by particular historic events). This analysis resulted in the identification of locations where the MIS system had a hydraulic deficiency (did not provide an adequate outlet for local connections or resulted in a conveyance-related SSO) based on the particular LOP. Problems caused by the Inline Storage System filling and closing were not considered hydraulic deficiencies. These locations were based on the projected flows for 2020 growth and are not necessarily deficient for existing conditions.

The 2020 Facilities Plan – Conveyance Report Chapter 9 contains a map and list of all of these identified locations for both the 5-year LOP (Figure 9-1 and Table 9-3 in the Conveyance Report) and 10-year LOP (Figure 9-2 and Table 9-4 in the Conveyance Report). In addition, the District has put in place the Adaptive Implementation Plan which monitors the need for these projects against actual flows.

5.2.6 PRIORITIZATION OF DEFICIENCIES AND IMPLEMENTATION PLAN

The 2020 Facilities Plan – Conveyance Report Chapter 10 contains the recommended conveyance facilities, programs, operational improvements and policies (FPOPs). Because all of the locations identified with hydraulic deficiencies are dependent upon the growth in flow due to development, the implementation plan will be based on monitoring of growth, development, and system flows.

The 2020 Facilities Plan – Facilities Plan Report Chapter 11 discusses the implementation of the recommendations.

5.3 WASTEWATER TREATMENT SYSTEMS

The District has two regional treatment plants, the Jones Island Water Reclamation Facility (JIWRF) and South Shore Water Reclamation Facility (SSWRF). The District service area is divided into areas tributary to JIWRF, areas tributary to SSWRF, and areas

tributary to both plants. The areas that are tributary to both plants can be diverted during wet weather, for maintenance purposes or for capital improvement projects.

5.3.1 SYSTEM DESCRIPTION

JIWRF serves the combined sewer system, located in the central portion of the City of Milwaukee and the eastern portion of the Village of Shorewood, as well as portions of separate sewer systems from the other satellite systems. It has a maximum daily flow capacity of 310 million gallons per day (MGD). There is 100 MGD of capacity available through Combined Sewer Wet Weather Flow Treatment up to a maximum treatment capacity of 390MGD.

The SSWRF primarily serves satellite systems that have separate sewers, although combined sewer flow can be diverted to the SSWRF. It has a maximum daily flow capacity of 265 MGD. Both treatment plants utilize primary treatment, secondary treatment and disinfection. The treatment processes differ though, and result in different classes of the resulting biosolids.

There is an Interplant Solids (IPS) Pump Station located both JIWFR and SSWRF. The JIWRF IPS Pump Station receives waste activated sludge from the SSWRF and transfers excess primary sludge and excess waste activated sludge (if present) to the SSWRF IPS Pump Station via four IPS pipelines to maintain constant Milorganite production.

The Inline Storage System (ISS) and the Northwest Side Relief Sewer consists of a network of tunnels located 300 feet below ground that have a combined capacity of 521 million gallons. The ISS temporarily stores and conveys both separate and combined sewer flow to optimize wastewater treatment plant capacities during wet weather events.

The 2020 Facilities Plan – Treatment Report Chapter 2 contains an in-depth description of the District wastewater treatment facilities and unit processes.

5.3.2 LEVEL OF PROTECTION

Working in conjunction with the conveyance and storage systems, the wastewater treatment plants must have sufficient capacity, for hydraulics and processing, to provide for planned wet weather capacity against sanitary sewer overflows from the Wastewater System. While processing these flows, the District also has the objectives (see the Management Plan, Chapter 2 of this document) of minimizing combined sewer

wet weather flow treatment events (used to increase JIWRF capacity to 390 MGD) and maximizing wet weather treatment capacity (to avoid filling the ISS). The District must at all times comply with permit effluent quality requirements, whether an eventis occurring or not.

The 2020 Facilities Plan – Treatment Report, Chapter 9 includes a discussion of Level of Protection as it relates to the treatment plants.

5.3.3 FLOW AND WASTELOAD ANALYSIS

In order to begin the analysis to determine if the JIWRF and SSWRF have adequate facilities for 2020 conditions, a prediction of the flow and wasteloads to each plant was projected. The wasteload is determined using the Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS) parameters.

The 2020 Facilities Plan – Treatment Report Chapters 4 and 5 and the associated appendices contain the full discussion of the flow and wasteload analysis for year 2000 and year 2020 conditions.

5.3.4 UNIT HYDRAULIC AND PROCESS CAPACITY ANALYSIS

A review and analysis of the JIWRF and SSWRF unit process capacities has been conducted as part of the 2020 Facilities Plan. These values were compared to year 2000 and year 2020 flows and wasteloads to determine deficiencies (relative to the selected Wastewater System LOP) at the treatment plants.

The 2020 Facilities Plan – Treatment Report Chapters 4 and 5 and the associated appendices contain the full discussion of the capabilities and deficiencies of the treatment plants for year 2000 and year 2020 conditions. Additional work was completed as part of the recommendation from the 2020 FP to perform further analysis. JIWFP and SSWRF Capacity Analysis Reports were completed in 2011 and provided further review of the unit process capacities.

5.3.5 PRIORITIZATION OF DEFICIENCIES AND IMPLEMENTATION PLAN

There are two major items that were recommended to be addressed during the 2020 implementation horizon. Increasing the capacity of the Inline Pump Station has been completed and alternatives are being evaluated for additional wet weather treatment

capacity at the SSWRF. Similar to the conveyance system, the implementation plan will be based on monitoring of growth and development in the area, as well as system flows.

The 2020 Facilities Plan – Treatment Report Chapter 10 contains the projects recommended for the treatment plants. The 2020 Facilities Plan – Facilities Plan Report Chapter 11 discusses the implementation of the recommendations.

5.4 WATERCOURSE SYSTEMS

The District has discretionary authority to construct watercourse system improvements within its jurisdictional watercourses. There are approximately 129.4 miles of watercourse system within the District's jurisdiction.

The District completed a Phase I study of each of the watercourse systems under its jurisdiction in the year 2000. These studies are called the Watercourse Management Plans (WMPs) (9) and are documented in five volumes. The volumes are titled:

1) Milwaukee River tributaries and Fish Creek (Lake Michigan Direct Drainage) - Phase I Watercourse Management Plan
2) Menomonee River - Phase I Watercourse Management Plan
3) Kinnickinnic River - Phase I Watercourse Management Plan
4) Oak Creek - Phase I Watercourse Management Plan
5) Root River - Phase I Watercourse Management Plan

The Milwaukee River study only included the Brown Deer Park Creek tributary as all other tributaries had been addressed in previous District studies. It also did not include the Milwaukee River main stem (MMSD did not take jurisdictional authority of the Milwaukee River main stem until 2003). Each of the other studies included the main stem and all of the major tributaries. These studies were conducted in a manner similar to a capacity study for a sewerage system and satisfy the intent of the SECAP as it is being applied to the District's watercourse system. These studies are not available online but have been previously submitted to the Wisconsin Department of Natural Resources (WDNR).

5.4.1 SYSTEM DESCRIPTION

The District's jurisdictional watercourse systems include approximately 25.5 miles of improved channel and 103.9 miles of natural channel. These are located along the:

1. Milwaukee River and its tributaries (28.2 miles);
2. Menomonee River and its tributaries (38.6 miles);

3. Kinnickinnic River and its tributaries (15.5 miles);
4. Oak Creek and its tributaries (17.4 miles);
5. Root River and its tributaries (27 miles); and
6. Lake Michigan direct drainage area (2.7 miles).

Appendix 5-1 provides a listing of the District jurisdictional watercourse systems. This listing is taken from the District's Surface Water and Storm Water rule (Chapter 13, District Rules). The listing and all of the District's rules are available at http://www.mmsd.com/rulesandregs/rules.

5.4.2 LEVEL OF PROTECTION

The District's Level of Protection goal with respect to watercourse systems is to cost-effectively remove structures from the 100-year floodplain and minimize the damage from the one-percent probability flood event. The District recognizes that further development in upstream areas may impact the ability of current and future District watercourse improvements to provide this Level of Protection. There are two programs to deal with future impacts: 1) Implementation of rules to limit stormwater runoff from new and redevelopment (District Rules, Chapter 13 - Surface Water and Storm Water rule); and 2) Purchasing key lands containing water absorbing soils (Greenseams program, see below).

5.4.2.1 SURFACE WATER AND STORM WATER RULE

The District developed and implemented the Surface Water and Storm Water rule (Chapter 13 – District Rules) in 2001. The amended version was approved on March 24, 2014. The intent of the rule is to:

- Reduce the effects of flooding;
- Maximize the effectiveness of District watercourse systems and flood abatement facilities;
- Reduce the impacts of flooding to the sanitary sewerage system;
- Promote comprehensive watershed planning; and
- Restore and enhance the use of regional watercourses.

The rule applies to new developments and redevelopments within the District's service area that increase the amount of impervious surface by 0.5 acre or more, with some limitations and exclusions. All of the District's rules are available online at http://www.mmsd.com/rules/index.cfm

5.4.2.2 GREENSEAMS PROGRAM

The intent of the Greenseams program is to permanently protect key lands containing water absorbing soils and preserve land along stream corridors. The purpose of these protections is to preserve the land's natural abilities to assimilate storm water runoff, while simultaneously providing wildlife habitat and recreational opportunities. Further information on the Greenseams program is available at www.mmsd.com/floodmanagement/greenseams.cfm.

5.4.3 FLOW GENERATION

During the preparation of the WMPs, models were constructed using the Hydrologic Simulation Program – Fortran (HSPF). These models were then used to generate flows that reach the MMSD jurisdictional watercourses for various events, including the one-percent probability flood event. There was a model developed for each watershed (Milwaukee River, Menomonee River, Kinnickinnic River, Root River, Oak Creek and Fish Creek) that was composed of sub-watersheds and sub-basins. The inputs for the watershed models were meteorological time series, hydrologic and basin parameters. The models were based on 2020 land uses.

Chapter 3 in each volume of the WMP describes the procedures used to construct the HSPF model, which was done in a similar fashion for each watershed.

5.4.4 HYDRAULIC MODELING

The HSPF models that were built for each watershed provide flow hydrographs at certain locations along the length of the watercourse channels. These flow hydrographs then become the input into another model that represents the watercourse conveyance channels. These models were all built using the Hydrologic Engineering Center – River Analysis System (HEC-RAS) model. These models were also completed during the preparation of the WMPs. The HEC-RAS models require channel dimensional information, roughness coefficients, bridge opening data (and other restrictions along the watercourse reaches), and the input flow hydrographs and locations. The HEC-RAS models then calculate water surface profiles.

The water surface profiles are used to determine the extent of the floodplain and the structures that will be impacted by an event, which is the one-percent probability flood event as the District's Level of Protection.

Chapter 3 in each volume of the WMP describes the procedures used to construct the HEC-RAS model, which was done in a similar fashion for each watershed.

5.4.5 IDENTIFICATION OF DEFICIENCIES

The result of the Phase I WMPs, which included the modeling described above, alternatives analysis and cost considerations, was a recommended list of jurisdictional watercourse projects for each watershed. Included in the scope of projects are:

- Watercourse conveyance improvements
- Surface water storage facilities
- Floodproofing structures
- Purchasing structures
- Implementing watershed-wide stormwater management regulations
- Preserving existing natural storage

The projects that were the result of earlier studies, such as Lincoln Creek improvements and storage facilities along Southbranch Creek and Indian Creek, are not in the WMPs.

5.4.6 PRIORITIZATION AND IMPLEMENTATION PLAN

Beyond the previously completed WMPs, the District has been implementing further studies, which include:

1. Additional Phase I studies (of watercourses not previously completed)
2. Planning studies that update previous Phase I studies (due to changes to the floodplain models that incorporates updated land use, rainfall data, and model corrections)
3. Phase II and preliminary engineering studies (detailed analysis and investigation of the proposed projects and flood management facilities proposed in the WMPs)
4. Sediment transport and geomorphic studies

The further studies include:

- Milwaukee River main stem – Watercourse System Plan (in progress)
- Fish Creek – Geomorphic Study (completed)
- Fish Creek – Planning study (budgeted)
- Menomonee River – Phase II WMP (completed)
- Menomonee River – Sediment Transport Study (completed)
- Menomonee River – Feasibility study for channel rehabilitation by the US Army Corps of Engineers (completed)
- Honey Creek – Planning study (in progress)
- Underwood Creek – Feasibility study for channel rehabilitation by the US Army Corps of Engineers (completed)
- Kinnickinnic River – Phase II WMP (completed)
- Kinnickinnic River – Sediment Transport Study (completed)

- Kinnickinnic River – Feasibility study for channel rehabilitation by the US Army Corps of Engineers (in progress)
- Wilson Park Creek – Planning study for reach between W. Euclid Avenue and S. Howell Avenue (completed)
- Wilson Park Creek – Preliminary engineering study for reach between Canadian Pacific Railroad and S. Howell Avenue (in progress)
- Lyons Park Creek – Planning study (in progress)
- Villa Mann Creek – Planning study (completed)
- Oak Creek – Phase I WMP (in progress)
- Root River – Phase II WMP (completed)
- Root River – Sediment Transport Study (in progress)

The majority of the watercourse improvement projects that were identified in the Phase I WMPs have either been studied further with a Phase II plan, implemented a preliminary engineering phase, or both.

5.5 SECAP UPDATES

The SECAP is a major effort for the District. The original SECAP was planned around the 2020 Facilities Plan and the Watercourse Management Plan. The SECAP will be reviewed during the program audit process. Those documents, along with the most recent WPDES permit will be evaluated to ensure the SECAP is in compliance.

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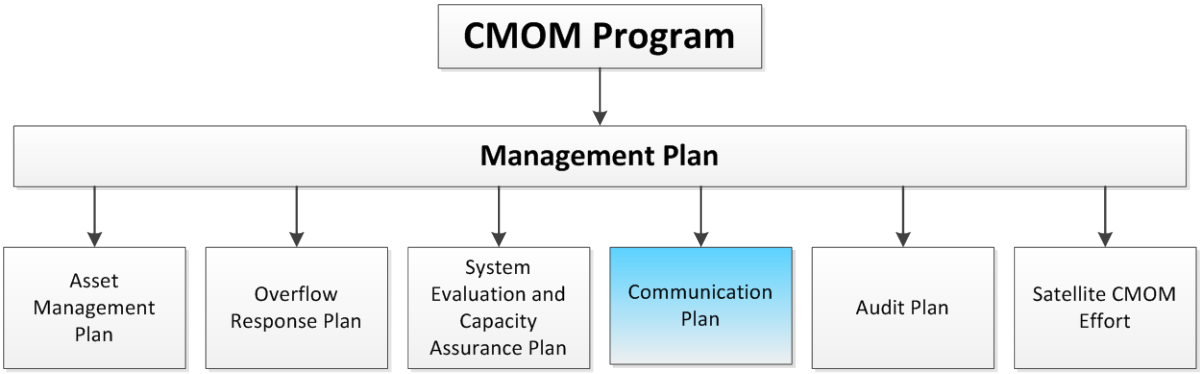
COMMUNICATION PLAN



Communication Plan

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6.1 COMMUNICATION PLAN

The Communication Plan serves to document the types and frequency of communications that will be prepared and distributed regarding the Capacity, Management, Operations and Maintenance (CMOM) Program.

The Communication Plan includes:

- A description of the reports and summaries that will be prepared by the District related to CMOM program
- The targeted audiences for the reports and information
- The methods of delivering the information to the targeted audiences
- The methods for receiving input regarding the CMOM Program

The report products will be discussed first (section 6.2 below), followed by the targeted audiences (sections 6.3 through 6.6). Included in each section for the targeted audiences will be the methods of delivery and receiving input.

6.2 COMMUNICATION PLAN PRODUCTS

The products that will result from the District CMOM Program are:

- CMOM Program documentation (this document)
- CMOM Program annual reports
- CMOM Program Audit Report

Each is discussed further below.

6.2.1 CMOM PROGRAM DOCUMENTATION

The District CMOM Program is described by this document. It will contain all of the plans that are part of the CMOM Program as separate chapters. The plans are the Management Plan (Chapter 2 of this document), the Asset Management Plan (Chapter 3 of this document), the Overflow Response Plan (Chapter 4 of this document), the System Evaluation and Capacity Assurance Plan (Chapter 5 of this document), the Communication Plan (Chapter 6 of this document), the Program Audit Plan (Chapter 7 of this document), and the Satellite CMOM Effort (Chapter 8 of this document).

The CMOM Program documentation will be made accessible from the District's internal and publicly accessible (www.mmsd.com) web sites.

6.2.2 CMOM PROGRAM ANNUAL REPORT

The CMOM Program Annual Report will include seven sections; a summary section and one section for each of the six plans that make up the District CMOM Program. The first section will be an overview of the Program, Program highlights from the reporting year and any changes to the Program.

The second section will focus on the performance measures (see the Management Plan, Chapter 2, section 2.7). The values of the performance measures will be documented and trended. In addition, there will be a discussion of the trends, whether they indicate the District is meeting its goals, and any changes to the strategies or tactics the District will employ to meet its goals. Also in the second section will be a discussion of any changes to the District organizational structure or Rules that impact the CMOM Program.

The third section will focus on the Asset Management strategies and tactics that have been added, deleted or modified, specifically as they relate to meeting asset management objectives.

The fourth section will include discussion of the Overflow Response Plan (ORP), overflows that occurred during the reporting year, and any updates to the ORP. The ORP also includes a discussion of any root cause analyses that were performed to mitigate the possibility of additional overflows.

The fifth section will include discussion of the System Evaluation and Capacity Assurance Plan and provide an update of District projects that evaluate or address capacity.

The sixth section will address the Communication Plan, including changes to any of the communication products, communication methods, or targeted audiences (stakeholders) of the CMOM Program.

The final section will disseminate any changes relating to the Audit Plan.

The CMOM Program Manager is responsible for completing and submitting the annual report to the Wisconsin Department of Natural Resources (WDNR) by the end of June each year. The Annual Report will go through the District's internal review process prior to submittal. The annual report will be made accessible from the District's internal and publicly accessible web sites.

6.2.3 AUDIT REPORT

The Audit Report will begin with a focus on the performance measures that have been identified as benchmarks (can be compared to other utilities and agencies). The trending of the benchmarks, as well as their value relative to other comparable agencies will be considered and discussed. In addition to trending the benchmarks, a review will also be conducted similar to the annual review of District performance measures.

Following the trending of the District benchmarks and performance measures, a complete review of the CMOM Program will be completed. By having trended the performance measures first, the review will be able to focus on the results obtained through implementation of District strategies and tactics. Successful strategies can continue to be employed and strategies that were not successful can be modified, replaced, or eliminated. All of the strategies must be directed towards contributing to the District's current goals and regulatory requirements. After the District has defined the strategies that will be employed to achieve its goals, the plans will be modified, as necessary, to align with the goals.

The end result will be a revised District CMOM Program. Included with the Audit Report will be a summary of the changes to the CMOM Program. For further information, see the Audit Plan (Chapter 7 of this document).

The Audit Report will be completed on a five year cycle under the direction of the CMOM Program Manager. The Audit Report and revised CMOM Program documentation will be made available from the District's internal and publicly accessible web sites.

6.3 DISTRICT INTERNAL COMMUNICATION

Internally at the District, there will be three methods of distributing information and receiving input regarding the CMOM Program:

- The District's SharePoint site
- Internal meetings
- Commission Memoranda

6.3.1 DISTRICT SHAREPOINT SITE

The District currently has an internal SharePoint site that allows for departments to have their own web pages and share information relative to each department's mission and functions. The CMOM Program links are located in the Asset Management library on the Planning, Research, and Sustainability Division page. There are links to:

- CMOM Program documentation (this document)
- CMOM Program annual reports
- The CMOM Program Audit Report

6.3.2 INTERNAL MEETINGS

The CMOM Program Manager works in the Planning, Research, and Sustainability Division of the District. The Water Quality Protection and Technical Services Divisions are also very involved in many CMOM Program tactics. The CMOM Program Manager will make presentations to the organization as needed to disseminate information regarding the CMOM program. See the Management Plan, Chapter 2, section 2.3 of this document for the organizational structure of the District.

6.3.2 COMMISSION MEMORANDA

The CMOM Program documentation, annual reports, and Audit Report will each be transmitted to the District Commission via a memorandum from the Executive Director. The memoranda will include a summary description of the program or report and impacts to the District.

6.4 SATELLITE COMMUNICATION

Representatives of the satellite system owners can find the latest information regarding the CMOM Program on the District's external website. There is also an exchange of the most recent emergency contact information related to District facilities performed on an annual basis.

6.5 REGULATORY COMMUNICATION

The annual report for District CMOM activities will be completed under the direction of the CMOM Program Manager and sent to the District's WDNR Permit Administrator by the end of June, each year.

The Audit Report will be completed under the direction of the CMOM Program Manager and sent to the District's WDNR Permit Administrator within 30 calendar days of its completion.

6.6 OTHER STAKEHOLDER COMMUNICATION

Other stakeholders to be included in communications related to the District CMOM Program are the consultants and contractors that perform work for the District, and the general public.

6.6.1 DISTRICT CONSULTANTS AND CONTRACTORS

The District currently holds annual meetings with its consultants and contractors. At future meetings, the CMOM Program Manager is responsible for presenting information regarding CMOM Program highlights and inviting discussion. The discussion will focus on the portions of the CMOM Program that are impacted by consultant and contractor work. The items will be centered on asset management and may include using District asset numbering schemes, preparing and submitting asset plans, submitting asset data equipment forms and updating O&M manuals.

6.6.2 GENERAL PUBLIC

The District currently has a publicly accessible web site (www.mmsd.com) that includes information on the District's history, current District programs (including the 2020 Facilities Plan/Water Quality Initiative), District Requests for Proposals and construction contracts, etc. The CMOM Program will have a page on this web site. The web page will have a short description of the CMOM Program, the personnel to contact with questions, current issues and links to various items. The links will be to:

- CMOM Program documentation
- CMOM Program annual reports
- A portal for inputting suggestions to the CMOM program
- The CMOM Program Audit Report

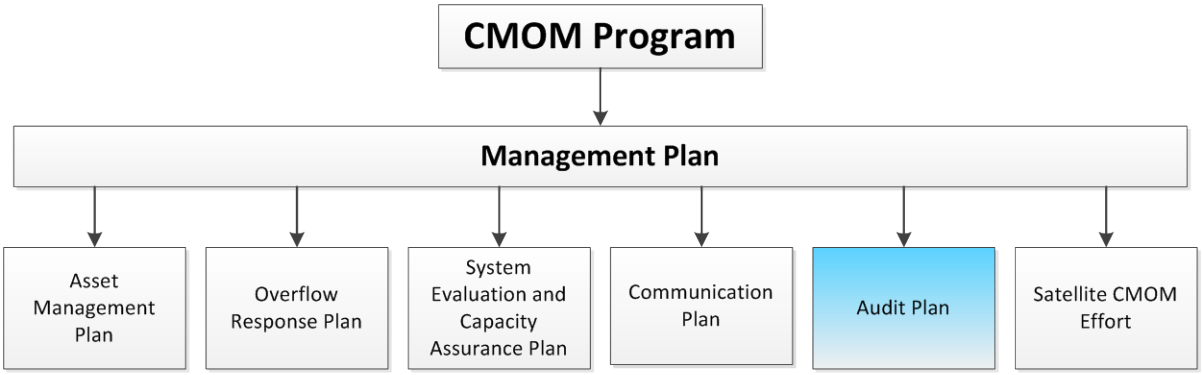
Groups and citizens that are particularly interested in water quality in the Milwaukee area, especially as it relates to District initiatives and overflow incidents can be included on a list maintained by the District's Public Information Manager. Being on this list, they will be provided with immediate notification of overflows via the 24-hour notification e-mail (see the Overflow Response Plan, Chapter 4, section 4.2 of this document).

6.7 COMMUNICATION PLAN UPDATES

The Communication Plan will receive annual updates, if required, after the annual review of the performance measures relating to communications has been completed. Any changes to the Communication Plan will be documented in the CMOM Program Annual Report. Any updates to the CMOM Program will be made after the completion of an audit.

For further information, see section 6.2.3 above and the Audit Plan (Chapter 7, section 7.2 of this document).

AUDIT PLAN



Audit Plan

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7.1 AUDIT PLAN

As part of the CMOM Program Communication Plan (Chapter 6 of this document), a CMOM Program annual report will be produced. The annual report will include updates to the Program. The audit will include a review of the entire CMOM Program. Any large scale and structural changes found to be necessary to the CMOM Program will be completed and documented during the audit. There will therefore be a section of the Audit Plan for Annual Updating (7.2), the CMOM Program Audit (7.3), and also a section for the documenting and processing of Program changes (7.4).

7.2 ANNUAL UPDATING

The annual updates to the CMOM Program will include a review of three areas. The first area will be the performance measures and the strategies that the District has in place to achieve the performance measures. The second area reviewed will be the suggestions that are provided through internal and external means for Program improvement. Lastly, a periodic gap analysis will be performed to assure all of the CMOM Program requirements are being met.

The CMOM Program Manager will be responsible for completing the annual review and update, preparing the documentation (included in the CMOM Program Annual Report) and coordinating the District's internal review.

7.2.1 PERFORMANCE MEASURES

The Management Plan (Chapter 2, section 2.7 of this document) contains all of the District performance measures that will be measured as part of the CMOM Program. These performance measures are set-up to be evaluated and reviewed annually to provide immediate feedback on the effectiveness of District operations and the performance of the CMOM Program. The performance measures chosen were those that were readily available, easily determined and directly related to the aim of the objective.

During preparation of the CMOM Program annual reports, all of the CMOM performance measures will be evaluated and tracked over time. If any of the performance measures are observed to require improvement, they will be identified and subject to further evaluation.

7.2.3 CMOM PROGRAM INPUT

The District will be soliciting input on the CMOM Program from stakeholders through a variety of means that are discussed in the Communication Plan. They include portals on District web sites for internal and external input, Division meetings, regular communication with satellite municipalities, and Consultant and Contractor meetings. These suggestions will be compiled and documented ineither the audit or annual report.

For the purposes of the annual update, the suggestions will be grouped by the CMOM Plan that they involve. The suggestions will be reviewed as to: 1) Necessity for compliance with regulations; 2) Compliance with District objectives; and 3) Costs and benefits. The items will be discussed as a group and individually, as necessary, to provide a basis for including any of the suggestions into the Program.

7.2.3 GAP ANALYSIS

A listing of gaps was created during the District's CMOM readiness review, completed prior to the preparation of the *CMOM Strategic Plan*. This listing of gaps has been prioritized and the gaps with the highest priorities have been addressed through the implementation of this CMOM Program and undertaking of other District projects.

In 2013, the District performed an asset management gap analysis using the Water Environment Research Foundation's (WERF) SAM-GAP tool. This, and any future gap analyses, will be used to identify any issues that need to be addressed in the CMOM Program.

7.3 CMOM PROGRAM AUDIT

The first CMOM Program audit review was initiated in 2012 and implemented in 2014. Based on the five year cycle, the next audit will occur in 2019.

The audit will include a review of the District CMOM performance measures, District CMOM Benchmarks and additional considerations, each of which is discussed below. The audit process will be conducted under the direction of the CMOM Program Manager and may include outside consultants or representatives from comparable utilities on the review panel, working in conjunction with the CMOM work team.

7.3.1 PERFORMANCE MEASURES

The performance measures that are listed in the CMOM Program Management Plan (Chapter 2, section 2.7 of this document) will be reviewed as to the current value, status and trend for the past five years. This review will indicate whether the District objectives are being attained and whether the trend is better performance or not. Either may indicate that individual strategies should be reviewed and revised with the goal of continuing to meet the CMOM objectives into the future.

Discussion will include a broad look at the performance measures for the overall CMOM Program and the three District service areas of: 1) Conveyance; 2) Treatment; and 3) Watercourse. Where specific performance measures are not being attained, detailed discussion and commentary will be included. The result may be a recommended change to the program, which could take the form of a revised objective, a revised strategy, a revised tactic, different performance measures, or lower attainment criteria for the performance measure.

7.3.2 BENCHMARKS

The benchmarks that are listed in the CMOM Program Management Plan (Chapter 2, section 2.6 if this document) will be reviewed in a manner similar to the performance measures. There will be a review of the value for the current year and of the trend over the past five years. In addition, the values and trends for similar agencies will be obtained and compared to the District's values and trends. The District will use the benchmarks to not only determine attainment of objectives, but to view the trends in the industry. This additional information is invaluable in helping the District to maintain an up-to-date, environmentally sound, and cost-effective status.

Discussion will include a broad look at the benchmarks that are listed in the CMOM Program by area. Where specific benchmarks are indicating that the District is not meeting an objective and/or not in the better half of similar wastewater utilities, a detailed discussion and commentary will be included. The result may be a recommended change to the program, which could take the form of a revised objective, a revised strategy, a revised tactic, or a revision to the benchmark.

7.3.3 ADDITIONAL CONSIDERATIONS

During the audit, several additional items will be considered that may affect a change in the CMOM Program. They are:

- WPDES Permit Requirements
- Anticipated Regulatory Requirements
- MMSD Strategic Plan Goals and Organizational Objectives

7.3.3.1 PERMIT REQUIREMENTS

During an audit, the most current District WPDES Permit will be reviewed to ensure the program is in compliance. When the District receives the next permit, it may contain additional requirements, such as further monitoring, overflow reduction, changes in reporting requirements, etc. These may impact the goals and objectives that are stated in the CMOM program and the way the District measures performance. These will be discussed and addressed in the CMOM Program Audit Report.

7.3.3.2 ANTICIPATED REGULATORY REQUIREMENTS

During the audit process, any proposed or anticipated regulatory requirements will be reviewed to identify possible changes to the CMOM Program to verify compliance.

7.3.3.3 DISTRICT STRATEGIC PLAN GOALS AND ORGANIZATIONAL OBJECTIVES

The District is currently on a three year cycle for preparing an overall strategic plan to meet its goals. The District may alter policies, programs and procedures that will affect the elements of the CMOM Program. During the audit, the strategic plan and other big picture objectives (District's 2035 Vision and Strategic Objectives). These issues will be discussed and addressed in the CMOM Program Audit Report.

7.4 PROGRAM CHANGE PROCEDURES

As a result of the audit, the CMOM Program will be updated. The procedure for updating this will be similar to the preparation of the initial CMOM Program. The CMOM Program Manager is responsible for ensuring the reviews listed above are completed and documented. Internal review teams, consisting of appropriate representation from across the District, will be formed for each chapter of the program. The changes that are being considered will be discussed by the review team, in

coordination with the CMOM Program Manager. The result of the discussions will be the recommended program changes.

The CMOM Program Manager will prepare the updated CMOM Program and send it through the internal review process at the District. After internal approval is complete, the updated Program will be forwarded to the District's Permit Administrator at the WDNR or another named WDNR representative.

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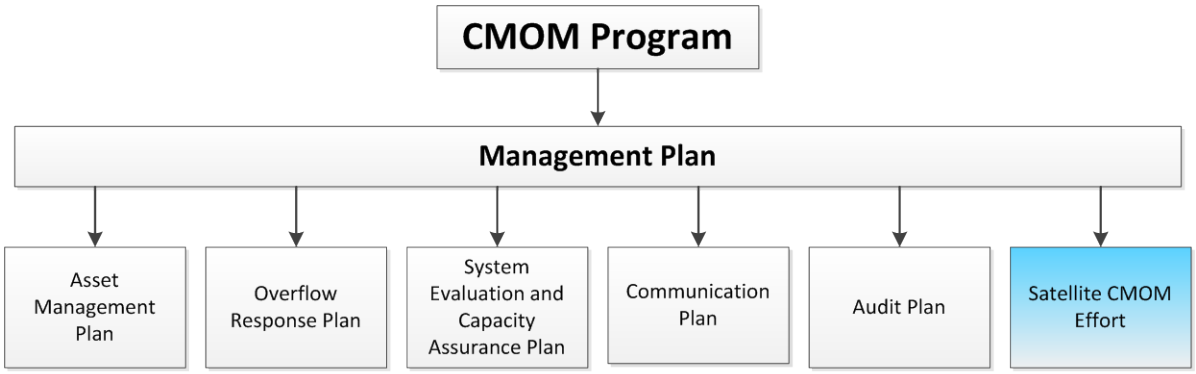
SATELLITE CMOM EFFORT



Satellite CMOM Effort

8.1 Satellite CMOM Effort
8.2 Satellite CMOM Program Development
8.3 District Rules
8.4 State Rules/WI Administrative Code NR210.23

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8.1 SATELLITE CMOM EFFORT

Satellite systems must have CMOM programs that comply with Wis. Adm. Code, sec. NR 210.23 and MMSD Rules, sec. 3.105. The District's effort regarding the satellite systems includes the following items:

- Satellite CMOM program development
- District Rules regarding satellite systems
- State Rules regarding satellite systems

8.2 SATELLITE CMOM PROGRAM DEVELOPMENT

The District began discussions with the satellite systems, as required by the Stipulation, in 2002. Since then, the District has continued meeting with each of the satellite systems and discussing their CMOM programs a minimum of once per year.

In addition, the District contracted with a consultant to work with each satellite system to:

- Complete a readiness review;
- Complete a gap analysis; and
- Prepare a report that includes;
    - Documentation of the readiness review and gap analysis; and
    - A strategic plan for complying with CMOM requirements.

The reports for each satellite were completed in 2007. The satellite CMOM programs were completed by June 30, 2009 as required by paragraph 22 of the 2005 Stipulation that was entered into between the State of Wisconsin and the 29 satellite systems that are tributary to the District's regional facilities (18). The text of paragraph 22 is shown below:

"MUNICIPAL CAPACITY, MANAGEMENT, OPERATION AND MAINTENANCE ("CMOM") PROGRAM DEVELOPMENT AND IMPLEMENTATION

22. No later than June 30, 2009, all Tributaries shall develop and implement Capacity, Management, Operation and Maintenance (CMOM) programs reflecting the requirements of MMSD's regional CMOM program, as contemplated by paragraphs 6-7 of the settlement stipulation in the case of State of Wisconsin v. Milwaukee Metropolitan Sewerage District, Milwaukee County Circuit Court Case No. 02-CV-2701."

The District's Rules, Chapter 3 also required that the satellite systems establish CMOM programs by June 30, 2009. Section 3.105 of the District's Rules, Chapter 3 includes the details of the requirements. Further discussion of Chapter 3 of the District's Rules is included below.

As mentioned above, the District has funded the readiness review and strategy development steps of the CMOM process for the satellite systems. In addition, templates for the management, overflow response, communication, audit, and system evaluation and capacity assurance plans were provided to each satellite system owner.

Establishing the CMOM program and completing the documentation was the last step and was completed by each satellite system by the established deadline.

8.3 DISTRICT RULES

The District has revised Chapter 3 of its Rules, which was previously titled *Infiltration and Inflow Control*, but is now *Management, Operation, and Maintenance of Tributary Sewers*. The revised Chapter 3 has been adopted by the District Commission on May 21, 2007, with an amended date of January 25, 2010.

The revised rule contains CMOM requirements for all satellite system owners that discharge into District sewers. The District requirements may be more stringent than what is specified in the stipulation between satellite systems and the State. The rule specifies that satellite system owners must have established systematic and proactive programs that include the following practices and activities:

- ✓ Maintaining sewer system plans
- ✓ Maintaining records of physical attributes and the condition of sewers
- ✓ Cleaning sewers and debris removal
- ✓ Condition monitoring programs
- ✓ Asset renewal programs
- ✓ Providing sufficient personnel
- ✓ Having and enforcing an inflow prevention ordinance

These activities and others regarding the satellite sewer systems are to be documented in the following set of plans that are required by the revised Chapter 3 of the District's Rules:

- ✓ Management Plan;
- ✓ Overflow Response Plan;
- ✓ Communication Plan;
- ✓ Audit Plan;

- ✓ System Evaluation and Capacity Assurance Plan (SECAP) (if hydraulic information is necessary to evaluate a sewer design decision or understand sewer performance); and
- ✓ Infiltration and Inflow Management Plan.

The District completed limited SECAP studies as part of its 2020 Facilities Planning process in 2006. If the District requires a satellite system owner to complete a SECAP, the limited study can be used as a basis for the complete SECAP. See Chapter 5, of this document for further information.

8.4 STATE RULES/WI ADMINISTRATIVE CODE NR210.23

In early 2013, the new WDNR rules regarding CMOM programs went into effect. According to the rules, all collection system operators are required to implement an effective CMOM program within three years of the effective date. Satellite systems are responsible for making sure their CMOM Programs meet all State requirements by early 2016.

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REFERENCES

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14. New Zealand Asset Management Support. *International Infrastructure Management Manual*, 2011.
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APPENDICES

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2-1 DISTRICT CMOM/ASSET MANAGMENT PROGRAM MANAGER JOB DECRIPTION

Preserving The Environment • Improving Water Quality

Milwaukee Metropolitan Sewerage District Position Description

Title:	CMOM/Asset Management Program Manager	Division:	Planning, Research & Sustainability
Reports to:	Planning, Research & Sustainability Director	Department:	Plng, Res. & Sustainability
FLSA Status:	Exempt	Date:	October 26, 2011

Position Purpose: Manage and oversee the daily operations of the District's Capacity Management Operation and Maintenance (CMOM) and Asset Management Programs, including management of the Enterprise Asset Management Plan.

Essential Duties and Responsibilities:

- Oversight, management and supervision of assigned staff to ensure the daily operations of the District's CMOM and Asset Management Programs.
- Perform the following CMOM functions:
    - Coordinate with the Facilities Planning
    - Perform as-needed reporting of the requirements of the WDNR 2002 Stipulation Agreement
    - Delegate or perform auditing responsibilities
    - Capital Improvement Program tracking
    - Review standards and specifications to ensure compliance with federal, state and local regulatory requirements
    - Examine, research, and recommend improvements to processes and procedures
- Perform the following Asset Management functions:
    - Communicate goals and strategies to the Executive Director, division managers and staff
    - Prepare and manage the Enterprise Asset Management Plan
    - Prepare a District facilities and operations improvement framework
    - Ensure allocation of resources meet program goals
    - Conduct regular program audits and manage corrective action processes
    - Monitor asset criteria such as enumeration scheme, condition monitoring methodology, database nomenclature and asset classes and categories
    - Assist planning and the strategic planning processes
    - Prepare and submit Capital Improvement Projects resulting from Asset Management Process
    - Track stakeholder needs to research and determine feasibility of opportunities for improvements
    - Track and report the asset management program key performance indicators
    - Oversee asset management program training
- Oversee assigned project contractors and evaluate progress to maintain budgetary limits and ensure completion of project deliverables.
- Lead cross-divisional Asset Management Team(s)
- Effectively present District programs and projects to internal and external stakeholders, citizen groups, elected officials, consultants, regulators and other agencies, technical groups and staff.
- Manage assigned capital and O&M projects
- Complete special projects as assigned.

Qualifications and Experience:

Education: Bachelors degree in engineering or related field.

Experience: Six to seven years of related experience; or an equivalent combination of education and experience
Licensure as a Professional Engineer is required
Prior managerial and supervisory experience
Project Management experience
Engineering or planning experience
Experience in sewer operations, maintenance and repair and surveying practices and techniques
High degree of interpersonal and problem-solving skills with demonstrated ability to resolve conflict

Experience (continued):

Excellent written and verbal communication skills
Ability to work in a highly political environment
Ability to apply engineering principles and practices to the solution of engineering problems
Ability to deliver public presentations
Computer software proficiency
Primavera schedule software experience is preferred

Organizational Competencies: **A** through **H** applies to all positions (detailed definitions—valued contributor and management & supervision apply to this position).

Certificates, Licenses, Registrations:

Valid driver's license

Physical Demands and Work Environment:

The physical demands and work environment characteristics described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions. Physical demands include:

1. Sitting for extended periods of time
2. Looking at glare of computer screen while creating and reviewing various documents, sometimes for extended periods of time
3. Moving while carrying documents and files
4. Make presentations at various locations
5. Must be able to travel 5% of the time
6. Must be able to drive to various work sites

Work environment: While performing the duties of this job, the employee works in an office environment and the noise level is moderate. While performing the duties of this job, the employee works in an office environment and is exposed to outside weather conditions or treatment plant conditions. While outside or at the treatment plants, employee may be exposed to extreme temperatures, wet and/or humid conditions, toxic or caustic chemicals, noise and fumes.

Travel: 5% required.

Employee:_____DATE:_____

Supervisor/Manager: _____DATE:_____

Division Director:_____DATE:_____

The above statements reflect the general details necessary to describe the principle functions of the occupation described and shall not be construed as a detailed description of all the work requirements that may be inherent in the occupation.

3-1 ASSET MANAGEMENT STRATEGY

Milwaukee Metropolitan Sewerage District
Veolia Water Milwaukee

Collaboration for Advanced Asset Management Practices

Asset Management Practices Gap Analysis - 2014 Asset Management Strategy

FINAL REPORT FEBRUARY 5, 2014

The 2014 Asset Management Strategy was developed by identifying the "best appropriate practices"; those "world-class" best practices that fit the unique MMSD organizational needs, identify the areas of most need and greatest return in terms of lifting Asset Management practice, and most directly impact the asset investment decision making process.

FINAL REPORT

Prepared by

Gregory Hottinger, P.E.
Milwaukee Metropolitan Sewerage District

Robert (Bob) Dannenberg
Business Analyst – Enterprise Asset Management
Veolia Water Milwaukee

FEBRUARY 5, 2014

Table of Contents

EXECUTIVE SUMMARY

The Milwaukee Metropolitan Sewerage District (MMSD) and Veolia Water Milwaukee (VWM) are collaborating on a project to evaluate the current state of MMSD Asset Management (AM) practices, identify gaps from industry accepted best practices, and develop a sustainable improvement plan (AM Strategy) to close the identified gaps in the District asset management program.

The driver behind the project is the District's desire to fully engage the organization in the formalized practices of asset management. While the District has historically managed assets very effectively a formalized asset management program was only recently established in 2007. The most recent gap analysis was performed in 2005 as part of the District's Capacity, Management, Operations and Maintenance (CMOM) program strategic plan. Understanding of overall asset management goals is currently understood by a small portion of the organization and knowledge of what asset management means varies greatly within the District. Results of the 2013 gap analysis will identify areas of focus to develop an organizational culture based on core asset management principles.

The gap analysis was completed using the Water Environment Research Foundation's (WERF) online SAM-GAP analysis tool. The tool consists of 150 questions broken down into seven core organizational "quality elements" that WERF has determined are fundamental components of a successful asset management organization's business model. To develop a broad perspective, the WERF SAM-GAP questionnaire was used to interview 35 key staff representing a broad range of departments and disciplines within MMSD and VWM during September of 2013. Data results from the interviews were compiled and evaluated and an overall organizational score was entered into the SAM-GAP tool. The summary report output from the SAM-GAP tool provided benchmark scoring relative to the top 10% of water and wastewater organizations in North America (Figure 1 below), and recommended improvements within the seven core organizational "quality elements" identified within the tool. The recommended improvements were reviewed by a team of MMSD and VWM staff and a framework of overall goals and task level SMART goals was established to create the 2014 AM Strategy to close identified gaps. A longer term three to five year improvement strategy will be developed in 2014, but the focus of this document is to identify improvements that can be accomplished in 2014 based on available resources within the current approved budget.

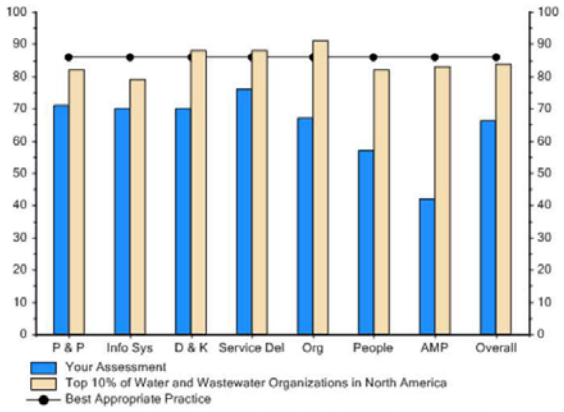


Figure 1 WERF MEASUREMENT OF MMSD GAPS

Asset Management Practices Gap Analysis
2014 Asset Management Strategy

The SAM-GAP tool identified gaps within all seven "quality elements", providing a weighted gap for each area and ranking the gaps from highest to lowest, as shown in the figure below.

Quality Elements	Weighted Gap	Rank
AM Plans (AMP)	44	1
People Issues (People)	29	2
Organizational Issues (Org)	19	3
Information Systems (Info Sys)	16	4
Data and Knowledge (D&K)	16	4
Process and Practices (P&P)	15	5
Service Delivery (Service Del)	10	6

Figure 2 WEIGHTED GAPS

The MMSD/VWM team utilized the SAM-GAP tool scoring and recommended improvements in conjunction with knowledge of the state of organizational asset management practice to develop the 2014 AM Strategy for asset management improvement. Overall goals of the 2014 AM Strategy were focused on areas of improvement that would provide the greatest impact on developing an organization-wide culture supporting asset management practices. Therefore, quality elements with the highest gaps were not necessarily considered the highest priority if the impact of closing the gap was less than other areas of focus. Goals were driven by identifying the "best appropriate practices" for our organization, meaning those world class best practices that are both affordable and applicable to our unique organizational needs.

The 2014 AM Strategy has been broken into the following four areas of focus, with corresponding overall goals. Additional task level SMART goals and specific gaps addressed are included within the body of the report on pages 30-36.

- **Asset Management Program Framework** - identifies the roles and responsibilities of staff to effectively implement asset management within the organization, identifies key documents required to develop program goals, objectives and required activities, and explains how AM integrates with existing business processes.
  - Goal 1 - Define and document District staff and stakeholder roles and responsibilities required for effective asset management.
  - Goal 2 – Define documentation required to communicate AM program goals, objectives and scheduled activities and build a foundation for continuous improvement.
- **Communications Plan** - identifies the strategies necessary to educate the entire organization on what the asset management program is, improvements expected through implementation, and why each staff member's role is important.
  - Goal 1 – Develop a strategy to communicate the AM program framework and overall goals across the organization and keep staff informed of the AM program progress.
  - Goal 2 – Develop AM training specific to organizational roles and responsibilities.
- **Standards and Procedures** - necessary to ensure staff members understand processes and data requirements related to asset management and ensure consistency of asset information from the planning phase through asset disposal.
  - Goal 1 – Review and improve existing, and develop new standards for the definition, collection, and storage of asset data elements.
  - Goal 2 – Review and improve existing, and develop new processes and workflows to ensure asset data is captured for added, modified and removed assets.
  - Goal 3 – Identify and prioritize projects to update asset data and improve capability of information systems.
- **Asset Management Plans** - are documents that collate information from all asset management practices within the organization and form the basis to communicate with customers, regulators and other stakeholders the investments required to achieve organizational objectives. AMP's can be

prepared at varying levels of detail from overall service level (conveyance, treatment, watercourse) down to asset system levels (e.g. return activated sludge pumps, watercourse culverts).

- Goal 1 - Develop a standard format for the creation of service level Asset Management Plans (AMP) and integrate AMP's into District business processes.

Asset Management Practices Gap Analysis
2014 Asset Management Strategy

GAP ANALYSIS

Definition

A "Gap Analysis" is a systematic process to characterize or "profile" an organization's current Asset Management (AM) business practices. A gap analysis measures where an organization is in its AM practices relative to where it wants to be within a specified period of time. The gap, as one might expect, is the distance between the "as is" of the current environment and the "to be" of the desired future state of the organization.

The gap analysis serves two purposes - it guides future action towards a measurable "state of practice" for the organization and it tracks progress along the way towards that goal. Both functions are important if the organization is to achieve a long-lived transition to a management paradigm and culture that is centered on an asset management perspective.

MMSD Asset Management History

The MMSD Asset Management (AM) program originated as a requirement from a legal stipulation with the State of Wisconsin in 2002 to implement a CMOM program by June 30, 2007. Asset management requirements were indicated in the Management Plan component of the CMOM requirements with the following language, "A significant effort associated with the management plan shall be the development of an asset management program that provides for both programmed maintenance and tracking of the asset condition to enable early recognition of expansions or major rehabilitation necessary to avoid capacity limitations." CMOM requirements from the 2002 stipulation were specific to the MMSD conveyance system; however, the MMSD determined principles of the CMOM and Asset Management programs should be applied to all District facilities (conveyance, treatment and watercourse) to ensure consistent management practices.

To prepare for the June 30, 2007 deadline to implement the CMOM program, the District hired a consultant to prepare a CMOM Strategic Plan. The purpose of the CMOM Strategic Plan was to identify gaps that existed between current MMSD practices and those identified to be required to implement the CMOM program. The CMOM Strategic Plan was completed in December 2005. One component of the CMOM Strategic Plan was an Asset Management Gap Analysis. The Gap Analysis was performed using the Australia/New Zealand approach to asset management as the standard for best practices. The 2002 edition of the International Infrastructure Management Manual was referenced to define best practices. A total of 12 major areas and 71 specific topic areas of asset management were evaluated to identify current level of practice, desired level of practice and corresponding gaps. Scoring was completed on a 0-100 scale with 0 being total unawareness and 100 being excellence in best practices. Scoring was determined based on document review, staff interviews and a series of workshops between consultants and staff to finalize scoring. A copy of the AM Program Evaluation Matrix from the 2005 CMOM Strategic Plan Gap Analysis is included as *Attachment 5*.

Many of the gaps identified in the 2005 CMOM Strategic Plan were incorporated into the initial CMOM Program documentation, completed in June 2007, with corresponding tasks to be completed to close the gaps. This information was included in the Asset Management Plan chapter of the CMOM documentation. The gaps were prioritized as immediate, near-term and long-term to identify timelines for completion. Immediate gaps were intended to be completed within the next year, near-term were within 2-5 years and long term were 5-10 years. It has been more than six years since the CMOM documentation was completed and a number of the immediate gaps have not been completed and most of the near and long-term gaps have not been fully addressed. There has not been an update to the 2005 gap analysis to identify current status of the asset management program against the 2005 status.

The District decided it was necessary to perform a current gap analysis to identify areas for improvement and compare current progress against 2005. The District, along with assistance from Veolia Water evaluated three potential gap analysis methods.

1.) Re-evaluate current status against the 2005 gap analysis using the same spreadsheet model
2.) Utilize WERF's online SAM-GAP tool
3.) Utilize the British Standard's Institute PAS-55 tool

It was determined that WERF's SAM-GAP tool was the most applicable since it has been rigorously tested over time, is updated against current best practices, is industry specific (water and wastewater) and allows performance to be easily updated over time using a web based tool. The 2005 gap analysis was not chosen since it was based on the 2002 International Infrastructure Management Manual so it is not current for best practices and was developed by a consultant specifically for the District so it has not been tested across the industry. The PAS-55 tool was not chosen since it is not industry specific, and is based on the 2008 PAS-55 standards so it is slightly outdated.

Results of the SAM-GAP analysis will be compared against the gaps identified from the 2005 CMOM Strategic Plan to gain insight on which gaps have not been addressed and why. It is anticipated that this effort will take place in 2014 as part of an overall District Asset Management Strategy which will identify future steps to achieve asset management implementation within the organization.

Advanced Asset Management Working Group

A team of MMSD and Veolia staff was assembled to guide the efforts of this collaborative effort, and evaluate the results of the work. A kick-off meeting was held on August 25, 2013 at MMSD offices to define the process and procedures necessary to execute the gap analysis and evaluate the results of the survey when completed.

Working Group Team Members

Name	Organization
Greg Hottinger {Project Manager}	MMSD AM
Bob Dannenberg {Project Manager}	VWM AM
Pat Obenauf	MMSD CCO
Kevin Lyons	MMSD CCO
Kathryn Camosy	MMSD AM
Brian Coonan	VWM AM
Marc Yarlott	VEOLIA TDG
Jeff Harvey	VEOLIA TDG
Ryan Johnson	VEOLIA TDG

Asset Management Practices Gap Analysis
2014 Asset Management Strategy

Methodology

The ***Water Environmental Research Foundation (WERF) "SAM-GAP"*** tool used to assist in the development of this report has been refined over a 20 year period by asset management practitioners, initially in Australia and New Zealand but increasingly from around the world, to assist in the gap characterization and profiling process. SAM-GAP facilitates clear identification of an organization's AM practices relative to:

- the best run asset-intensive organizations in the world
- a set of comparable peers
- and most importantly, what is reasonable and relevant for a given organization

A questionnaire of 150 questions related to 7 Core Quality Elements are included in the SAM-GAP tool. Quality Elements are fundamental components of an organization's business model that drive the sustained success of the organization.

CORE QUALITY ELEMENTS
PROCESS AND PRACTICES
INFORMATION SYSTEMS
DATA AND KNOWLEDGE
SERVICE DELIVERY
ORGANIZATIONAL ISSUES
PEOPLE ISSUES
ASSET MANAGEMENT PLANS

The full SAM-GAP questionnaire used for this evaluation is included as *Attachment 1* of this report.

Process

Selection

Individuals from within the MMSD organization were selected for participation, representing a wide range of departments and disciplines. Representatives from the following departments were included:

- FACILITIES INFORMATION
- WATER QUALITY
- ENGINEERING
- INFORMATION TECHNOLOGY
- PLANNING
- BUDGET
- ASSET MANAGEMENT
- SUSTAINABILITY
- CONTRACT COMPLIANCE
- PROCUREMENT
- ACCOUNTING
- EXECUTIVE DIRECTOR
- RISK MANAGEMENT
- AGENCY SERVICES

A matrix was developed to select relevant questions for each individual from the SAM-GAP tool questionnaire.

Additional individuals were selected from within the Veolia Water organization representing the various Operations and Maintenance (O&M) disciplines. Representatives from the following areas were included:

- CAPITAL DEVELOPMENT
- CONVEYANCE
- MAINTENANCE
- INFORMATION TECHNOLOGY
- OPERATIONS

A matrix was developed to select relevant questions for each individual from the SAM-GAP tool questionnaire.

A total of 35 individuals were selected and participated in interviews of up to two hours each. A total of 70 hours of interviews were conducted for this assessment.

A full list of the individuals interviewed is included as *Attachment 2* to this report.

Interviews

A two-person team from Veolia Water North America (VWNA) Technical Direction Group (TDG) and Veolia Water Milwaukee (VWM) were selected to perform the interviews, and developed a standard methodology for conducting all interviews. Each member of the Veolia team was assigned responsibility as either the Moderator or the Interviewer for each interview.

The Moderator was responsible for reading the introductory material, providing instructions to the participants, and recording of responses and comments provided by the person being interviewed.

The Interviewer asked the selected questions, presented examples, and prompted interviewees for scoring according to the parameters defined in the question. In addition, if the person being interviewed had questions regarding the terminology, standard definitions were provided.

Specific restrictions were placed on the interview team, designed to keep each interview consistent and to avoid going over the scheduled time. These included a requirement that no one should guide or prompt for a specific response to any question, not to use the opportunity to teach any Asset Management practice, or make any comment concerning the individual's score or the scoring of other interviews.

Asset Management Practices Gap Analysis
2014 Asset Management Strategy

Scoring

The person being interviewed was asked to provide two separate scored responses to the questions posed. Scores for every response would range from 0 to 5. The majority of the questions required responses on the following criteria.

- **Level of Practice**: "Level of practice" is the highest level of practice used across most relevant parts of the organization for most assets

  0 = "Innocence"
  1 = Aware but no practice
  2 = Low practice level
  3 = Modest practice level
  4 = Substantial practice level
  5 = "World class" practice level

- **Extent of Practice**: "Extent of practice" is how widespread the use of these best practices are across the entire organization for all assets

  0 = Never done
  1 = Ad hoc process rarely executed
  2 = Ad hoc process occasionally executed
  3 = Mixture of ad hoc and systematic process, partially documented
  4 = Mostly systematic process, pretty well documented, and regularly executed
  5 = Systematic, fully documented process, always executed

Questions related to Information Systems were scored on responses to

- Level of Practice: Systems in place throughout the organization

  0 = No relevant information systems in place
  1 = Very few automated systems/applications in place
  2 = Some automated systems in place, most manual
  3 = Mix of automated and manual systems
  4 = Most work processes are automated
  5 = All work processes automated

- Extent of Practice: How well the systems are used across the entire organization

  0 = No systems in place, hence no use
  1 = For the most part, the systems are archaic and outdated; poorly used
  2 = A few systems are well used, most are not
  3 = Mix of well used and not used
  4 = Most are well used
  5 = All are well used

Questions related to Data Quality were scored on responses to

- Completeness of the Asset related data

  0 = 0% complete - no data
  1 = 35% complete
  2 = 50% complete
  3 = 65% complete
  4 = 80% complete
  5 = 95% complete

- Accuracy of the Asset related data

  0 = mostly inaccurate / out of date
  1 = 35% accurate / up to date
  2 = 50% accurate / up to date
  3 = 65% accurate / up to date
  4 = 80% accurate / up to date
  5 = 95% accurate / up to date

Innocence

A broad range of questions were selected for each person interviewed. As a result some participants had no knowledge of specific subject matter resulting in a score of 0 at both the Level of Practice and Extent of Practice. For these instances scores were noted as 'Innocence" in the subsequent evaluations.

All scoring of "Innocence" was discarded in the base Data Evaluation to avoid skewing data by responses from those with no knowledge in specific areas. However, additional analysis of all Innocence scores will be performed to determine if this in fact reflects knowledge gaps in the Asset Management program.

DATA EVALUATION

Interview results, including scored responses and notes and comments recorded by the Moderator were entered into a data inventory tool built specifically for this gap analysis by VWM.

Evaluation Data Base

Data was then sorted within the data inventory tool and summarized to provide overall statistics for the responses to each question, including the average and weighted mean, and frequency distribution for both the Level of Practice (LOP) and Extent of Practice (EOP).

A detail review feature was included in the tool to allow the evaluation to look at who provided the responses. This feature was utilized when determining the overall organization score since respondents often had knowledge in specific service areas that needed to be reviewed to determine overall scoring.

Responses that were scored as "Innocence" were not included in the evaluation.

The actual evaluation and the resulting gap scoring process was completed in two steps. The first step was to have the MMSD Asset Manager review the data and provide a first opinion of the scores reported by assigning an overall organizational score for each question. The Veolia Team also performed the same independent evaluation of the data.

This two-step evaluation and scoring process was adopted to prevent bias by personal weighting in the interpretation of scores by any one member of the team.

Finally, both of these overall organizational scores from the evaluation were entered into the data inventory tool for comparative purposes.

Data Analysis Report

Results from the data inventory tool were summarized into the SAM-GAP Gap Analysis Response Statistics report. This report provides overall statistics for the responses to each question, including the average and weighted mean, frequency distribution for both the Level of Practice (LOP) and Extent of Practice (EOP), and the overall organizational score entered in the online SAM-GAP analysis tool.

This final report is included as *Attachment 3* to this report.

SAM-GAP Report Preparation

Upon completion of the data evaluation phase, the final overall organizational scores were entered into the online SAM-GAP analysis tool.

After all data entry was complete and verified, the SAM-GAP ASSET MANAGEMENT GAP ANALYSIS AND BENCHMARKING report was provided as the output from the SAM-GAP tool.

This report is included as *Attachment 4* to this report.

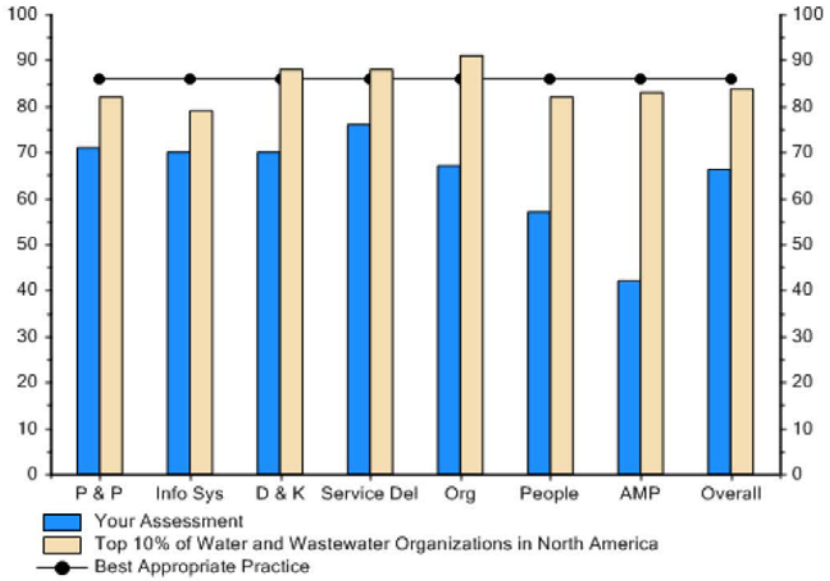
Asset Management Practices Gap Analysis
2014 Asset Management Strategy

PRELIMINARY GAP REPORT ANALYSIS

The SAM-GAP tool report provides scoring that is benchmarked to the top 10 percent of Water and Wastewater organizations in North America.
According to the report analysis of the 7 Core Quality Elements, MMSD rated an overall score of 65, against the top 10% score of about 85.

Primary Quality Element Benchmark

The SAM-GAP report provides identification and ranking of the gaps identified, (Core Quality Elements that are below the Best Practice measurement).



MMSD scores are measured against the benchmarks for the Primary Core Elements in the graph. MMSD scoring reflected in Blue. The difference between the MMSD assessment and the "Best Practice" as determined by the top ten percent in North America is the measured GAP in Asset Management practices.

The following is a weighted numerical gap for the MMSD assessment. The core quality element of Asset Management Plans shows the greatest point gap of 44 points from the "Best Practice" standard, while Service Delivery shows the smallest gap of 10 points.

Quality Elements	Weighted Gap	Rank
AM Plans (AMP)	44	1
People Issues (People)	29	2
Organizational Issues (Org)	19	3
Information Systems (Info Sys)	16	4
Data and Knowledge (D&K)	16	4
Process and Practices (P&P)	15	5
Service Delivery (Service Del)	10	6

Secondary Quality Elements

Assessment scoring is also provided for Secondary Quality Elements to identify more specific gaps within the Primary Quality Elements. There are a total of 23 Secondary Quality elements measured in this benchmark.

The top ten greatest gaps in the Secondary Quality elements are:

Rank	Section	Element
1	7.01	Asset Management Plans
2	2.03	Tertiary Information Systems
3	6.01	People Issues
4	5.01	Organizational Issues
5	1.12	Continuous Improvement
6	3.03	Tertiary Data and Knowledge
7	2.02	Secondary Information Systems
8	1.04	Strategic Planning
9	1.06	Business Risk Management
10	3.02	Secondary Data and Knowledge

Asset Management Practices Gap Analysis
2014 Asset Management Strategy

MMSD GAP ANALYSIS REVIEW

Introduction

The MMSD Gap Analysis Review section of this report identifies primary and secondary quality element gaps that are proposed to be addressed in 2014. These gaps have been prioritized based on the size of the gap, impact to the overall Asset Management Program and availability of resources. A detailed discussion of the gaps reported by the SAM-GAP Analysis tool is included with a summary of key factors that identify the area as a gap from best practices benchmarks, and identifies key improvements that will be addressed in proposed MMSD Action Plans.

Additional information and full lists of key recommendations are provided in the SAM-GAP Asset Management Gap Analysis report in *Attachment 4* of this document.

This section will not make specific recommendations for action in any of these areas, but will provide an outline for discussion and action in Advanced Asset Management Practices workshops. These workshops and the resulting action plan are included later in this report.

GAPS TO BE ADDRESSED IN 2014
Asset Management Plans
Organizational Issues
People Issues
Knowledge of Assets
Creation & Acquisition
Rationalization & Disposal
Continuous Improvement
Strategic Planning

Asset Management Plans

As noted in the Preliminary Report Analysis, the core element with the greatest gap is shown as a lack of Asset Management Plans throughout the organization.

Tracing this back to the actual interviews, and re-examining the questions and examples provided, it becomes apparent that the significant gap in this area is deeper than just AMP's are missing from the organization, but actually is rooted in a lack of understanding of what an AMP is, and how it benefits the organization.

There appears to be an underlying belief by some that Asset Maintenance Plans are the same as an Asset Management Plan. Asset Management Plans are the collation of all asset management practices within the organization and form the basis of the external interface with customers, regulators, and other stakeholders. Asset Management Plans can be considered as the business case for long term financial forecasts.

A robust and substantiated Asset Management Plan for all assets, that clearly outlines level of service, risk, and cost, will significantly improve organizational direction and focus.

Key Improvements

The key improvements in this area should include

- Creation of a standard for the development of Asset Management Plans
- Provide for the distribution and education of the AMP standard throughout the organization
- Develop Asset Management Plans for each service provided by the organization
- Develop processes for review and updating of the Asset Management Plans (AMP's)

Organizational Issues

The organizational structure of a business determines its ability to optimize resources in order to deliver an efficient outcome and provide flexibility in line with the changing needs of the customer and other stakeholders.

Underlying the entire process and as specifically noted in the above section on AMP's, there are a number of specific gaps identified within the organization, none of which is greater than the understanding of what is expected by everyone in the organization.

Currently, there are pockets of Asset Management function within MMSD, but the responsibility is not clear throughout the organization. The creation of the Asset Management Executive Steering Committee is a step in the right direction, but the membership and participation in the committee, its purpose and goals, and level of responsibility for the advancement of Asset Management Practices has not been communicated and some people in the organization are even unaware of its existence. In addition there exists an Asset Management Team but the roles and responsibilities of the team members are not defined.

This section relates to the way the organization supports asset management and its effective service delivery.

Key Improvements

The key improvements in this area should include:

- Review and improve the organization's commitment to Asset Management, including the documentation of this commitment in corporate policies, mission statements, and business plans
- Review and improve the corporate vision so that it reflects a commitment to best practice Asset Management and make it visible by displaying it publicly
- Review and develop clearly defined Asset Management roles and responsibilities for all staff members

People Issues

People, their skills, and their attitudes drive the business to achieve its goals and deliver services in an efficient way. Your organization is your people, and the outcomes that you deliver are therefore dependent upon them.

There will be some obstacles that need to be overcome to move the program forward, such as resources (both people and financial), contractual (MMSD\Veolia), and knowledge\education\training. The key to overcoming these potential obstacles will be a commitment to improvement from Executive and senior management, and frequent, clear, and concise communication of the mission and goals throughout the entire organization. Change management must include the organizational structure and the culture through participation, measurement, and communication of both successes and failures.

Key Improvements

The key improvements in this area should include:

- Review and improve existing and develop new processes as required to enable improved efficiency and effectiveness throughout the organization, and convey and promote the value of improved efficiency and effectiveness through asset management
- Review and improve existing and develop new processes as required for developing appropriate skills in both Asset Management and project work
- Review and improve existing and develop new processes as required for the management of knowledge throughout the business, and convey and promote the value of knowledge management through asset management

Knowledge of Assets

All Asset Management policies, procedures, and practices will ultimately require basic asset knowledge. An axiom of Asset Management is "we can't manage what we can't see".

This will require a clear, complete asset registry across all business segments of the organization. The asset registry is the database listing of assets and associated asset attributes and information. Procedures, including quality assurance, will need to be in place to manage the asset registry, including the very basic definition of what is an asset.

A data standard must be documented for base asset knowledge (such as description, location, nameplate, type\class, in-service dates) in order to know the state of the registry.

A data standard must be documented for extended Asset knowledge (such as specification, bill of material, cost, or useful life) so informed decisions can be made in the operation and maintenance of such equipment.

Standards and procedures for other asset knowledge, including valuation, condition, utilization, and risk (failure including probability, cause, and remediation policy such as repair\replace) must be in place for financial budgeting, capital expenditure and O&M forecasting, and the ability of the organization to meet expected service demand levels.

A major area of asset knowledge addressed in this Gap Analysis, and indicated as a key improvement will be documentation and audit of the standard for capturing, maintaining, and the ongoing quality assurance of "hard documents". This includes maintenance manuals, design and as-built drawings, operation manuals, troubleshooting guides, etc. and making that information available to those that need the information in a timely manner. This may include operators, maintenance technicians, contractor and subcontractor technicians, engineers, planners, and designers.

Key Improvements

The key improvements in this area should include review and improvement of existing standards and development of new standards as required to capture, document and verify the following asset data elements:

- Asset hierarchical structure - the level to which asset information is collected
- Asset valuation data - asset replacement values, historical values, and depreciated values
- Detailed physical attributes - manufacturer, serial numbers and spare parts
- Asset condition data - rating of asset condition
- Asset performance data - rating of asset performance
- Risk assessment data - risk calculation recorded against assets including likelihood and consequence of failure
- Life cycle cost histories - stored history of life cycle cost calculations

Asset Creation and Acquisition, Rationalization and Disposal

This particular area of the Gap Analysis actually scores among the highest of all areas within the review, meaning the gap between current practice and best practice is the smallest.

When reviewing the Gap Analysis and key improvement areas, there is a need to ensure that these higher scoring areas are not just ignored. This particular section has much room for improvement, and is a foundational requirement for many of the key gaps identified elsewhere.

For instance, there are processes in place to capture asset acquisition and disposal, but the execution of those processes does not always meet expectations, nor is their sufficient quality assurance processes to ensure the level of accuracy required in asset knowledge standards.

The report calls out a number of key improvements, particularly one to review, document, and implement processes for program management to track projects from the strategic planning stage through to the final service delivery including commissioning and handover.

Addressing the key improvements in this area will strengthen the overall Advanced Asset Management practices, and should not be ignored or given lower priorities simply based on the total gap assessment scores.

Key Improvements

The key improvements in this area should include:

- Review and improve existing and develop new processes as required for program management to track projects from the strategic planning stage through to the final service delivery including commissioning and handover
- Review and improve existing and develop new processes as required for asset commissioning and handover to ensure that all the required information is collected, including as-constructed drawings, operations/maintenance manuals, and "burn-in" metrics where appropriate
- Review and improve existing and develop new processes as required for rationalizing the existing asset portfolio in order to identify assets for disposal, mothballing, or transfer
- Review and improve existing and develop new processes as required for disposing of assets, including the updating of all relevant asset records
- Review and improve existing and develop new auditing practices as required to ensure the processes above are followed

Continuous Improvement

Particular attention should be paid to this section of the SAM-GAP report, as it will need to be incorporated into all asset management improvement projects or tasks developed to close the gaps identified.

Every change incorporated, as well as current areas of Asset Management that will not change directly as a result of this project, must include documentation of standards and procedures being included, and specific methods and measurements to assure the quality of those processes.

These quality assurance processes may include internal guidelines, measurement and reporting tools of accuracy and completeness, and methods for internal and external audits.

Key Improvements

The key improvements in this area include:

- Review and improve existing and develop new standards as required for a knowledge management base for Asset Management that covers all life cycle Asset Management functions
- Review and improve existing and develop new process diagrams and flowcharts as required for all life cycle Asset Management functions
- Review and improve existing and develop new processes as required for internal quality assurance or audit in relation to life cycle asset management
- Review and improve existing and develop new processes as required for externally auditing and/or benchmarking of Asset Management practices

Strategic Planning

Strategic planning as referenced by the gap analysis includes policy and practice related to understanding of asset failure, the risk of such failure, and the strategic planning for managing that risk. Strategic planning incorporates risk management, overall business goals and financial resources to ensure the best value is achieved from available budgets.

Processes must be established for predicting expected failure modes for all assets. This requires an understanding of likely failure modes and which of the major failure modes is most imminent. Major failure modes being defined as physical, capacity, level of service or economic failure. Links must be established from the imminent failure mode with projecting remaining useful life.

These processes and the underlying asset knowledge developed are then used for undertaking risk assessments of asset failure for inclusion within the planning process.

Strategic plans include the ability to make optimized asset renewal decisions by identifying the most economical renewal (repair, refurbish, replace) solution and point in time to renew an asset.

Key Improvements

The key improvements in this area include:

- Review and improve existing and develop new processes as required for predicting likely failure modes for individual assets or their components, including identification of the most imminent failure mode
- Review and improve existing and develop new processes as required for undertaking risk assessments of asset failure for inclusion within the planning process, including the likelihood and consequence of a particular asset failing
- Review and improve existing and develop new processes as required for making optimized asset renewal decisions in order to choose the most economical solution at the right time

Asset Management Practices Gap Analysis
2014 Asset Management Strategy

MMSD ACTION PLAN

Detail Gap Recommendations

Results of the SAM GAP tool revealed gaps in all seven of the primary quality elements. The Advanced Asset Management (AAM) Working Group determined gaps that could be addressed in 2014 should be identified and prioritized to define work tasks for the coming year. This decision was made to allow scheduling of resources available in 2014. Tasks to be started in 2014 were primarily determined based on impact on the overall AM program, size of gap, and availability of resources.

A full analysis and prioritization of gaps within the seven quality elements is intended to be performed over the first half of 2014 as one of the priority tasks. This will result in a long term (3 to 5 year) AM Strategy for MMSD Asset Management improvement, including scheduling of resources and budgets for 2015 and beyond.

Advanced Asset Management Working Group

A meeting of the AAM Working Group was scheduled and the results of the gap assessment were discussed in workshop form, to review identified gaps and develop a consensus on the overall priority and methods that should be adopted to begin closure of identified gaps, and advance the MMSD Asset Management program.

The results of this initial workshop developed an overall framework for the 2014 AM Strategy and established general priorities for further developing that framework. Each item in the framework was expanded by additional review of the gap analysis by team members to develop a task level project plan for 2014.

Every task identified within the 2014 AM Strategy, no matter the level or complexity of the task, will require a SMART goal be defined for that task.

SMART = Specific, Measurable, Achievable, Relevant, Time-bound

SMART goals will provide the basis for establishing priorities of work, and justification for the expenditure of resources to complete the proposed task.

2014 Asset Management Strategy

The AAM Working Group determined that the gaps identified to be addressed in 2014 could be more clearly presented to stakeholders if broken into broad areas of focus that were more easily understood than the seven primary and 23 secondary quality elements. These focus areas were identified as the building blocks to developing an organization wide Asset Management Program. The four areas of focus are:

- Asset Management Program Framework
- Asset Management Communications Plan
- Asset Management Standards and Procedures
- Asset Management Plans

Each area of focus addresses multiple primary and/or secondary quality element gaps which are listed under the area of focus. Task level SMART goals have been identified to address the gaps. The following sections outline each of these areas of focus.

Asset Management Program Framework

The AM Program framework identifies the roles and responsibilities of staff to effectively implement asset management within the organization, identifies key documents required to develop program goals, objectives and required activities, and explains how AM integrates with existing business processes. The framework provides a "line of sight" indicating how organizational strategic objectives filter down to drive day to day operational activities as well as showing how a bottom-up flow of asset knowledge and data are utilized to influence strategic level decisions through continuous improvement. The framework typically includes a high level graphical flow chart to visually display the interactions required between staff, business processes and documents to implement strategic AM.

Goal 1 - Define and document District staff and stakeholder roles and responsibilities required for effective asset management.

SMART GOALS	Target Date	Gaps Addressed
Review existing documentation describing roles and responsibilities of staff dedicated to asset management (i.e. the Asset Management Department) and modify as necessary. Review current AM staff level and identify additional staffing requirements and proposed timelines for additions.	*April 2014*	5.01 - Organizational Issues
Define and document roles, responsibilities and recommended staff members for the Asset Management Executive Steering Committee (AMESC) and the Asset Management Team (AMT). Identify positions that should have membership in either the AMESC or AMT included in their job descriptions and accountabilities.	*April 2014*	5.01 - Organizational Issues
Define and document asset management roles and responsibilities for staff in all District departments. In addition, define AM responsibilities of stakeholders, designers and contractors.	*April 2014*	5.01 - Organizational Issues
Develop process to incorporate asset management responsibilities into staff job descriptions and accountabilities. Identify staff responsible to review existing job descriptions and accountabilities and develop timelines to make required updates.	*September 2014*	5.01 - Organizational Issues

Goal 2 – Define documentation required to communicate AM program goals, objectives and scheduled activities and build a foundation for continuous improvement.

SMART GOALS	Target Date	Gaps Addressed
Develop a Commission level AM Policy to define program goals, and describe relationships to strategic goals, permit/legal requirements, and other District policies.	*April 2014*	5.01 - Organizational Issues
Adopt a 3-5 year AM Strategy that details the objectives and tasks required to be accomplished for continuous improvement of the AM program. The format shall include timelines and resource requirements, and be developed as a living document to track achievement.	*June 2014*	1.12 - Continuous Improvement
Develop a document that visually communicates the scope of asset management (i.e. Asset Management Program Framework). Include organizational roles, key documentation and interactions with business processes.	*June 2014*	1.12 - Continuous Improvement

Communications Plan

The communications plan identifies the strategies necessary to educate the entire organization on what the asset management program is, improvements expected through implementation, and why each staff member's role is important. Asset management involves cultural change in the way most organizations do business and how internal departments interact. To achieve the maximum benefits of asset management the entire staff needs to be engaged in the overall goals of the organization and clearly understand their role in meeting those goals.

Goal 1 – Develop a strategy to communicate the AM program framework and overall goals across the organization and keep staff informed of the AM program progress.

SMART GOALS	Target Date	Gaps Addressed
Develop an internal presentation explaining overall goals of AM, the AM program framework and the steps being taken to integrate AM within the District culture.	*April 2014*	6.01 – People Issues
Identify the most effective meeting format for the AM presentation and present to all District staff.	*June 2014*	6.01 – People Issues
Develop a tracking tool to document progress in achieving the AM strategy goals and make the tool available to all District staff on Sharepoint. Encourage members of the AMESC and AMT to provide AM program updates at staff meetings, referencing the tracking tool.	*April 2014*	1.12 - Continuous Improvement

Goal 2 – Develop AM training specific to organizational roles and responsibilities.

SMART GOALS	Target Date	Gaps Addressed
Schedule an outside consultant with AM expertise to conduct an asset management workshop for the AM Executive Steering Committee, AM Team members, and possibly senior managers and Commissioners to provide an overview of AM principles, benefits and evidence of successful programs.	*March 2014*	6.01 – People Issues
Conduct internal AM workshops with each department across the organization with appropriate training specific to the department roles and responsibilities in AM.	*December 2014*	6.01 – People Issues

Asset Management Standards and Procedures

Documented asset management data standards and procedures are necessary to ensure staff members understand processes and data requirements related to asset management. Documentation and routine audits to ensure standards are being followed are necessary to ensure consistency of asset information from the planning phase through asset disposal. This area will focus on review and improvement of existing standards and procedures to ensure they meet current AM needs, and development of standards and procedures where they are lacking. Additional tasks will be included for review and improvements to data and information systems, since current data and information systems will likely not meet all revised standards. This will require tasks to update asset data and improve information systems.

Goal 1 – Review and improve existing, and develop new standards for the definition, collection, and storage of asset data elements.

SMART GOALS	Target Date	Gaps Addressed
Review and improve existing, and develop new standards as required to define what is classified as an asset for each District service area (conveyance, treatment, watercourse), define the hierarchical structure of assets, how assets are to be named and numbered and how they are classified (e.g. Class – Pump, Type – Centrifugal).	*April 2014*	1.02 - Knowledge of Assets
Review and improve existing, and develop new standards as required for detailed asset specification requirements that will be driven by the asset class and type. Examples of specification data include material type, pipe diameter, pump horsepower, voltage, etc…	*June 2014*	1.02 - Knowledge of Assets
Review and improve existing, and develop new standards as required for asset accounting and cost data. This includes definition of estimated asset useful life to be used for depreciation, how planning, design, construction, operational and maintenance costs are tracked (life cycle costing) and how asset valuations are performed and reported.	*September 2014*	1.03 – Accounting and Costing
Review and improve existing, and develop new standards as required for asset condition assessment requirements. This includes definition of condition assessment procedures, scoring systems, frequency and parties responsible.	*December 2014*	1.02 - Knowledge of Assets
Review and improve existing, and develop new standards as required for asset failure and risk requirements. This includes definition of how failure modes are developed, documented and predicted, how consequence of failure is developed and scored, how likelihood of failure is developed and scored and how overall business risk is calculated.	*December 2014*	1.04 – Strategic Planning, 1.06 – Business Risk Management
Develop tools to measure compliance of existing data with revised data standards and report deficiencies.	*December 2014*	1.12 – Continuous Improvement
Evaluate adoption of Reliability Centered Maintenance (RCM) as the strategic level maintenance optimization framework for treatment plant and conveyance AGAM (Above Ground Asset Management).	*December 2014*	1.10 - Maintenance

Review and improve existing, and develop new standards as required for the collection, storage and retrieval of "hard" asset information, including original equipment manufacturer information, O&M manuals, specifications and record drawings.	*December 2014*	1.02 – Knowledge of Assets, 1.07 – Creation and Acquisition
Review and improve existing, and develop new standards as required for the collection of asset operational data, including equipment run-time, down-time and utilization, operator logs, and power and energy use.	*December 2014*	1.02 – Knowledge of Assets

Goal 2 – Review and improve existing, and develop new processes and workflows to ensure asset data is captured for added, modified and removed assets.

SMART GOALS	Target Date	Gaps Addressed
Review and improve existing, and develop new processes as required to ensure asset data is correctly captured for Capital Improvement Projects. This includes identification of assets in project plans and specifications, accurate tracking and transfer of asset costs, capture of required asset specification information and completion and receipt of record drawings and operations manuals.	*September 2014*	1.07 – Creation and Acquisition, 1.08 – Rationalization and Disposal
Review and improve existing, and develop new processes as required to ensure asset data is correctly captured for Operations and Maintenance Projects. This includes identification of assets in project plans and specifications, accurate tracking and transfer of asset costs, capture of required asset specification information and completion and receipt of record drawings and operations manuals.	*September 2014*	1.07 – Creation and Acquisition, 1.08 – Rationalization and Disposal
Review and improve existing, and develop new processes as required to ensure asset data is correctly captured for non-MMSD projects (Municipal, DOT, utility) that impact MMSD assets. This includes identification of assets in project plans and specifications, accurate tracking and transfer of asset costs, capture of required asset specification information and completion and receipt of record drawings and operations manuals.	*December 2014*	1.07 – Creation and Acquisition, 1.08 – Rationalization and Disposal

Goal 3 – Identify and prioritize projects to update asset data and improve capability of information systems.

SMART GOALS	Target Date	Gaps Addressed
Develop projects and budgets for future budget cycles to address data gaps that do not conform to defined asset data standards. Task will require both modifications to existing database information to meet defined standards and investigation and input of data where information is missing.	*June 2014*	3.01 – Primary Data and Knowledge, 3.02 – Secondary Data and Knowledge, 3.03 – Tertiary Data and Knowledge
Review current IT systems being utilized to capture and store asset data and information to identify improvements necessary to support AM. Develop projects and budgets and software upgrades if necessary to meet data and information requirements.	*June 2014*	2.01 – Primary Information Systems, 2.02 – Secondary Information Systems, 2.03 – Tertiary Information Systems

Asset Management Plans

Asset Management Plans are documents that collate information from all asset management practices within the organization and form the basis to communicate with customers, regulators and other stakeholders the investments required to achieve organizational objectives. AMP's can be prepared at varying levels of detail from overall service level (conveyance, treatment, watercourse) down to asset system levels (return activated sludge pumps, watercourse culverts). AMP's can be viewed as presenting the business case for long term financial forecasts. A robust and substantiated Asset Management Plan for all managed assets that clearly outlines level of service, risk and cost, will significantly improve organizational direction and focus.

Goal 1 - Develop a standard format for the creation of service level Asset Management Plans (AMPs) and integrate AMPs into District business processes.

SMART GOALS	Target Date	Gaps Addressed
Incorporate sustainable asset management principles into the upcoming Facilities Plan (FP). The FP scope will include requirements to prepare service level (conveyance, treatment, watercourse/watershed) Asset Management Plans as a deliverable. AMP's will include: • Definition of services provided and current service levels • Projection of future demands and desired service levels • State of assets report including age, condition, performance, value/cost • Assessment of predicted failure modes, consequences of failure, and risk • Assessment of predicted O&M, renewal/replacement, new asset and asset disposal costs • Recommended capital and O&M alternatives and costs to optimize investment • Identification of data, IT and knowledge management improvements	*February 2014*	1.10 – Demand Analysis, 1.12 – Strategic Planning, 7.01 – Asset Management Plans
Coordinate with the District and consultant FP team to identify data and information improvement projects (asset condition, consequence of failure, etc...) that can be completed during the course of the FP to improve quality of AMP's. Develop budgets and schedules for project completion by either District or consultant staff. Projects included in this task will be outside the scope of the FP.	*June 2014*	7.01 – Asset Management Plans

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4-1 SANITARY OVERFLOW LOCATIONS

Sanitary Overflow Locations

District Site Number	WPDES Permit ID Number	Location	Pump or Gravity	Current SCADA	Current Portable	Proposed SCADA	Notes
BS0101	220	S Howell Ave at E Grange Ave (ext'd)	Gravity	Yes			
BS0302	233	W Fisher Pkwy at N 106th St	Gravity	Yes			
BS0303	247	W Oklahoma Ave, 100 feet w/o S 74th St	Pump	Yes			
BS0304	242	S 79th St (ext'd) & W Dickenson St (ext'd)	Gravity	Yes			
BS0401	235	N Honey Creek Pkwy & W Wisconsin Ave	Pump	Yes			
BS0402	237	N Menomonee River Pkwy, 300 feet e/o N 68th St	Gravity	No	No	No	Outfall is bulkheaded and will be abandoned in the future. Not able to overflow at this location.
BS0403	234	N Honey Creek Pkwy & W Portland Ave	Gravity	Yes			
BS0404	263	W Green Tree Rd & Milwaukee River	Gravity	Yes			
BS0503	226	W Roosevelt Dr & N 35th St	Pump	Yes			

Sanitary Overflow Locations

District Site Number	WPDES Permit ID Number	Location	Pump or Gravity	Current SCADA	Current Portable	Proposed SCADA	Notes
BS0504	214	W Hampton Ave & N Lydell Ave	Gravity	No	No	No	Manually activated gate
BS0505	223	W Villard Ave & N 27th St	Pump	Yes			
BS0506	231	N Range Line Rd & Milwaukee River (east side)	Pump	Yes			
BS0507	229	N 46th St & W State St	Gravity	Yes			
BS0511	207	N 31st St & W Fairmont Ave	Gravity	No	Yes	No	Installed portable on 4/12/2005
BS0512	244	N Lydell Ave & W Lancaster Ave	Gravity	No	No	No	Manually activated gate
BS0513	245	N Lydell Ave & W Montclair Ave	Gravity	No	Yes	Yes	MS0508, and portable meter in overflow pipe
BS0514	209	N 27th St & W Silver Spring Dr	Gravity	No	Yes	No	DISTRICT expects to turn this over to the City of Milwaukee
BS0515	266	200 E River Woods Parkway. [Manhole 02140 – s/o E Hampton Rd & N Lydell Ave, s/o Milwaukee River (formerly Pillsbury Silos)]	Gravity	Yes			Level monitored at NS3 JC. Multiple conditions must be met on SCADA to confirm overflow.

Sanitary Overflow Locations

District Site Number	WPDES Permit ID Number	Location	Pump or Gravity	Current SCADA	Current Portable	Proposed SCADA	Notes
BS0516	265	4700 N Estabrook Parkway. [Manhole 02141 – s/o E Hampton Rd & N Lydell Ave, n/o Milwaukee River (formerly Pillsbury Silos)]	Gravity	Yes			Level monitored at NS3 JC. Multiple conditions must be met on SCADA to confirm overflow.
BS0601	225	S 35th St & W Manitoba St	Pump	Yes			
BS0602	232	S Kinnickinnic Ave & E St Francis Ave	Gravity	Yes			
BS0603	243	W Lincoln Ave, 565 feet w/o S 43rd St	Gravity	No	Yes	No	Site to be checked whether it can be abandoned
MS0409	206	RR Tracks 500' s/o Milwaukee/Ozaukee County border and 200' w/o Waverly Rd	Gravity	Yes			Level sensor in MS0409, which has a gravity overflow pipe
PS0402	264	Ravine Lift Station	Gravity	Yes			

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4-2 COMBINED SEWER OVERFLOW LOCATIONS

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Burnham Canal	189	189	CT07	400	Yes	S 9th St	
Burnham Canal	190	190	CT07	363 & 400A	Yes	S 9th St	
Burnham Canal	191	191	CT07	399	Yes	S 11th St	
Burnham Canal	193	193	CT07	398	Yes	S 13th St	
Burnham Canal	194	194	CT07	360, 361 & 396	Yes	S Muskego Ave	
Kinnickinnic River	19	85046	None	None	N/A	S 1st St at the Kinnickinnic River	MIS Overflow
Kinnickinnic River	148	148	CT08	369	Yes	E National Ave	
Kinnickinnic River	149	149	CT08	362 & 368A	Yes	S of E Walker St	
Kinnickinnic River	150	150	CT08	367	Yes	S of E Washington St	
Kinnickinnic River	151	151	CT08	346	Yes	E Greenfield Ave	
Kinnickinnic River	152	152	KK03	342	Same structure	S Kinnickinnic Ave	
Kinnickinnic River	153	153	KK03	339	Yes	S Kinnickinnic Ave	
Kinnickinnic River	154	154	KK03	341	Yes	S 1st St	
Kinnickinnic River	155	155	KK03	340	Yes	S 1st St	
Kinnickinnic River	156	156	KK03	345A & 366	Yes	S 2nd St	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Kinnickinnic River	157	157	KK03	345	Yes	W Rogers St	
Kinnickinnic River	158	158/159	KK03	343, 344A &364	Yes	W Becher St	
Kinnickinnic River	159	158/159	KK03	343, 344A & 365	Yes	W Becher St	
Kinnickinnic River	160	160	KK04	None	Yes	E Lincoln Ave	
Kinnickinnic River	161	161	KK04	330	Same structure	W Lincoln Ave	
Kinnickinnic River	162	162	KK04	331	Same structure	W Lincoln Ave	
Kinnickinnic River	163	163	KK02	328	Yes	S Chase Ave	
Kinnickinnic River	164	164	KK02	327	Yes	S Chase Ave	
Kinnickinnic River	165	165	KK01	325	Same structure	W Cleveland Ave	
Kinnickinnic River	166	166	KK01	325	Same structure	W Cleveland Ave	
Kinnickinnic River	166A	KK1JC01	KK01	None	N/A	S 6th St at W Cleveland Ave	KK1 Junction Chamber
Kinnickinnic River	167	167	KK01	City Manhole	Yes	S 8th St	
Kinnickinnic River	168	168	KK01	City Manhole	Yes	S 14th St	
Kinnickinnic River	169	169	KK01	City Manhole	Yes	S 27th St	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Kinnickinnic River	260	DC0103	None	None	N/A	S 6th St & W Oklahoma Ave	Converted from SSO
Lake Michigan	195	195	LMN	338	Same structure	E Bay St	
Lake Michigan	196	196	LMS	335, 336 & 337	Yes	E Russell Ave	
Lincoln Creek	145	145	NS12	500	Yes	N 35th St & W Congress St	
Lincoln Creek	197	BS0502	None	None	N/A	Hampton Ave at 32nd St	
Menomonee River	10	85047	None	None	N/A	W Canal St at 8th St	MIS Overflow
Menomonee River	170	170	CT08	404	Yes	S 2nd St	
Menomonee River	172	172	CT07	197B & 197C	Yes	N Ember La	Upsized in 2007
Menomonee River	173	173/174	CT07	196A & 388	Yes	N 15th St	
Menomonee River	174	173/174	CT07	196A & 388	Yes	N 15th St	
Menomonee River	175	175	CT07	387	Yes	N 17th St	
Menomonee River	176	176	CT5/6	195, 380 & 502	Yes	N 25th St	
Menomonee River	177	177	CT5/6	195, 380 & 502	Yes	N 26th St	
Menomonee River	177A	CT5/6	CT5/6	None	N/A	123 N 25th St (CT5,6)	
Menomonee River	178	178	CT5/6	358 & 359A	Yes	S 27th St	
Menomonee River	180	180	CT5/6	357 & 381	No	S 35th St	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Menomonee River	181	181	CT3/4	377	Same structure	W Wisconsin Ave	
Menomonee River	182	182	CT3/4	193A, 372 & 372A	Yes	N 43rd St	
Menomonee River	182A	C182A01	CT3/4	None	Yes	4251 W State St (CT3,4)	54" flow balance overflow
Menomonee River	183	183	CT3/4	183	Yes	N 45th St	IS183 goes to City sanitary
Menomonee River	184	DG08-03	CT02	187A & 188	Yes	N Hawley Rd	
Menomonee River	185	185	CT07	386	Yes	N 9th St (Ext'd)	
Menomonee River	262	BS0405	None	None	N/A	N 59th St & W Trenton Pl	Converted from SSO
Milwaukee River	15	85043	None	None	N/A	N Marshall St at the Milwaukee River	MIS Overflow
Milwaukee River	16	85042	None	None	N/A	W Vliet St ext'd, east of N 3rd St	MIS Overflow
Milwaukee River	17	105/017	NS08	None	N/A	N Van Buren St at E Brady St	MIS Overflow
Milwaukee River	18	BS0701	None	None	N/A	S Water St at E Bruce St	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Milwaukee River	51	51	NS07	208	Yes	Point 300' west of N Humboldt Ave & N Weil ext'd	
Milwaukee River	89	NS11JC01	NS11	134	Yes	E Capitol Dr	
Milwaukee River	90	90	NS04	135A	Yes	E Keefe Ave	
Milwaukee River	91	91	NS04	73 & 74A	Yes	E Edgewood Ave	
Milwaukee River	92	92	NS05		Yes	E Auer Ave	
Milwaukee River	94	94	NS05	135	Yes	E Burleigh St	
Milwaukee River	96	NS5A02	NS05	None	Yes	E Locust St	
Milwaukee River	97A	97	NS06	136	Yes	E Park Pl	
Milwaukee River	98	98	NS06	137 & 228	Yes	E Bradford Ave	
Milwaukee River	99	99	NS07	141 & 228A	Yes	E Boylston St	
Milwaukee River	101	101	NS07	230	Yes	N Pulaski St	
Milwaukee River	102	102	NS07	207 & 207A	Yes	N Humboldt Ave	
Milwaukee River	103	103	NS07	231	Yes	N Marshall St	
Milwaukee River	103A	NS7	NS07	None	N/A	1944 N Commerce St	NS07 Junction Chamber
Milwaukee River	104	104	NS07	199 & 200A	Yes	N Holton St	
Milwaukee River	106	106	NS08	209	Yes	N of E Pleasant St	
Milwaukee River	107	107	NS08	210	Yes	E Walnut St	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Milwaukee River	108B	108	NS08	233	Yes	E Pleasant St at N Water St	Constructed in 2007 to replace 108 and 108A
Milwaukee River	109	109	NS08	211	Same structure	N of W Cherry St	
Milwaukee River	110	110	NS08	201A & 212	Yes	W Cherry St	
Milwaukee River	111	111	NS08	234	Yes	E Lyon St	
Milwaukee River	112	112	NS09	235	Same structure	E Ogden Ave	
Milwaukee River	113	113	NS09	213	Yes	W McKinley Ave	
Milwaukee River	113A	113A	NS09	214A	Yes	W Juneau Ave (Park West Freeway)	
Milwaukee River	114	114	NS09	215	No	W Juneau Ave	
Milwaukee River	115	115	NS09	216	No	W Highland Ave	
Milwaukee River	116	116	NS09	237	No	E Highland Ave	
Milwaukee River	117	117	NS09	217	No	W State St	
Milwaukee River	118	118	NS09	146 & 238A	No	E State St	
Milwaukee River	119	119	NS09	218	Yes	W Kilbourn Ave	
Milwaukee River	120	120N/120S	NS09	147, 239, 239A & 239B	No, Same, Same	E Kilbourn Ave	
Milwaukee River	121	121	NS09	219A	Yes	N of W Wells St	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Milwaukee River	122	122	NS09	205, 206 & 220	No	W Wells St	
Milwaukee River	123	123	NS09	198 & 240	No	E Wells St	
Milwaukee River	124	124	NS09	221	Yes	N of W Wisconsin Ave	
Milwaukee River	125	125	NS09	222	No	W Wisconsin Ave	
Milwaukee River	126	126	NS10	241	Same structure	E Wisconsin Ave	
Milwaukee River	127	127	NS10	223	No	W Michigan St	
Milwaukee River	128	128	NS10	242	No	E Michigan St	
Milwaukee River	129	129	NS10	224	Yes	N of W Clybourn St	
Milwaukee River	130	130	NS10	225	Yes	W Clybourn St	
Milwaukee River	131	131	NS10	243	No	E Clybourn St	
Milwaukee River	133	NS10F05	NS10	227	Yes	W St. Paul Ave	
Milwaukee River	134	134	NS10	244	No	E St. Paul Ave	
Milwaukee River	135	135	NS10	245	Yes	E Buffalo St	
Milwaukee River	136	136	NS10	246	Same structure	E Chicago St	
Milwaukee River	137	137	CT08	405	Same structure	S 1st Pl	
Milwaukee River	139	139	CT08	406	Yes	E Pittsburgh Ave	
Milwaukee River	140	140	NS10	247	Yes	N Broadway	

Combined Sewer Overflow Locations

Receiving water (of combined sewer overflow)	Combined Sewer Outfall Number	Diversion Structure Number	ISS Drop Shaft	Intercepting Structure Number	IS Upstream of DS	Location	Notes
Milwaukee River	141	141	CT08	403, 403A & 407	Yes	E Florida St	
Milwaukee River	142	142	NS10	248A	Yes	E Polk St	
Milwaukee River	143	143	CT08	370	Same structure	E Bruce St	
Milwaukee River	144	144	NS08	234A	Yes	E Lyon St	
Milwaukee River	146	146	NS07	142A	Yes	N Arlington Pl	
Milwaukee River	147	147	NS09	145 & 236	No	E Juneau Ave	
Milwaukee River	230	BS0501	None	None	N/A	N Richards St & E Congress St	Converted from SSO
South Menomonee Canal	61	EWWE	None	None	N/A	3rd & Seeboth	Emergency Wastewater Exit
South Menomonee Canal	187	187	CT08	401 & 402	Yes	S 4th St	
South Menomonee Canal	188	188	CT08	394	Yes	S 6th St	

4-3 SATELLITE CONTACTS LIST

Municipality	Business Hours	After hours / weekends
Bayside	414-351-8811	414-351-8800
Brookfield	262-782-0199	262-782-0199 262-787-3700
Brown Deer	414-357-0120	414-371-2900
Butler	262-783-2525	262-783-2525
Caledonia	262-681-3900	262-939-3409
Cudahy	414-769-2216	414-769-2260
Elm Grove	262-782-6700	262-786-4141
Fox Point	414-351-8900	414-351-9900
Franklin	414-425-7510	414-425-2522
Germantown	262-250-4721	262-253-7780
Glendale	414-228-1710	414-228-1753
Greendale	414-423-2133	414-423-2121
Greenfield	414-761-5301	414-761-5374
Hales Corners	414-529-6140	414-529-6140
Menomonee Falls	262-532-4800	262-532-1700
Mequon	262-236-2913	262-242-3500
Milwaukee	414-286-2489	414-286-2489
Muskego	262-679-4128	262-679-4130
New Berlin	262-786-7086	262-782-6640
Oak Creek	414-768-7060	414-768-7060
River Hills	414-352-0080	414-351-9900
St. Francis	414-481-2300	414-481-2232
Shorewood	414-847-2650	414-847-2610
Thiensville	262-242-3720	262-242-2100
Wauwatosa	414-471-8422	414-471-8422
West Allis	414-302-8800	414-302-8000
West Milwaukee	414-645-6238	414-645-2151
Whitefish Bay	414-962-6690	414-962-6690

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4-4 SITUATIONAL CONTACTS LIST

Situation	Urgency	Direct to	Phone number
Water in basement	Critical	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Sewage overflow	Critical	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Spill of a hazardous substance into the sewer system	Critical	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Clogged MIS or structure	Critical	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Illegal dumping into a sewer	Urgent	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Illegal dumping into catch basin	Urgent	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Contractor hit District facility	Urgent	Debra Jensen (District) Larry Anderson (Backup)	414-225-2143 (Backup 617-1429)
Manhole cover missing	Urgent	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Blockage/major debris in the river	Urgent	Dave Fowler (District) Patrick Elliot (Backup)	414-277-6368 cell - 559-9883 (Backup 414-225-2168 Cell - 414-313-1608)
Facility ownership question	Non-emergency	Debra Jensen (District)	414-225-2143
Municipal request regarding sewer system	Non-emergency	Debra Jensen (District)	414-225-2143
How much water is in the deep tunnel	Non-emergency	District Public website	www.mmsd.com click on storm update
How much rainfall have we received	Non-emergency	District Public website	www.mmsd.com click on storm update
Odor complaint	Non-emergency	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Maintenance of a District conveyance facility	Non-emergency	Central Control Operator (Veolia)	414-282-7200 (internal x3491)
Watercourse maintenance issue (e.g. grass cutting, graffiti, snow plowing)	Non-emergency	Dave Fowler (District)	414-277-6368 cell - 414-559-9883
Construction site complaint	Non-emergency	Rick Niederstadt (District)	414-225-2173 Cell - 414-617-6859
Notice of Intent to Discharge into MMSD system	Non-emergency	Peter Topczewski (District)	414-225-2176

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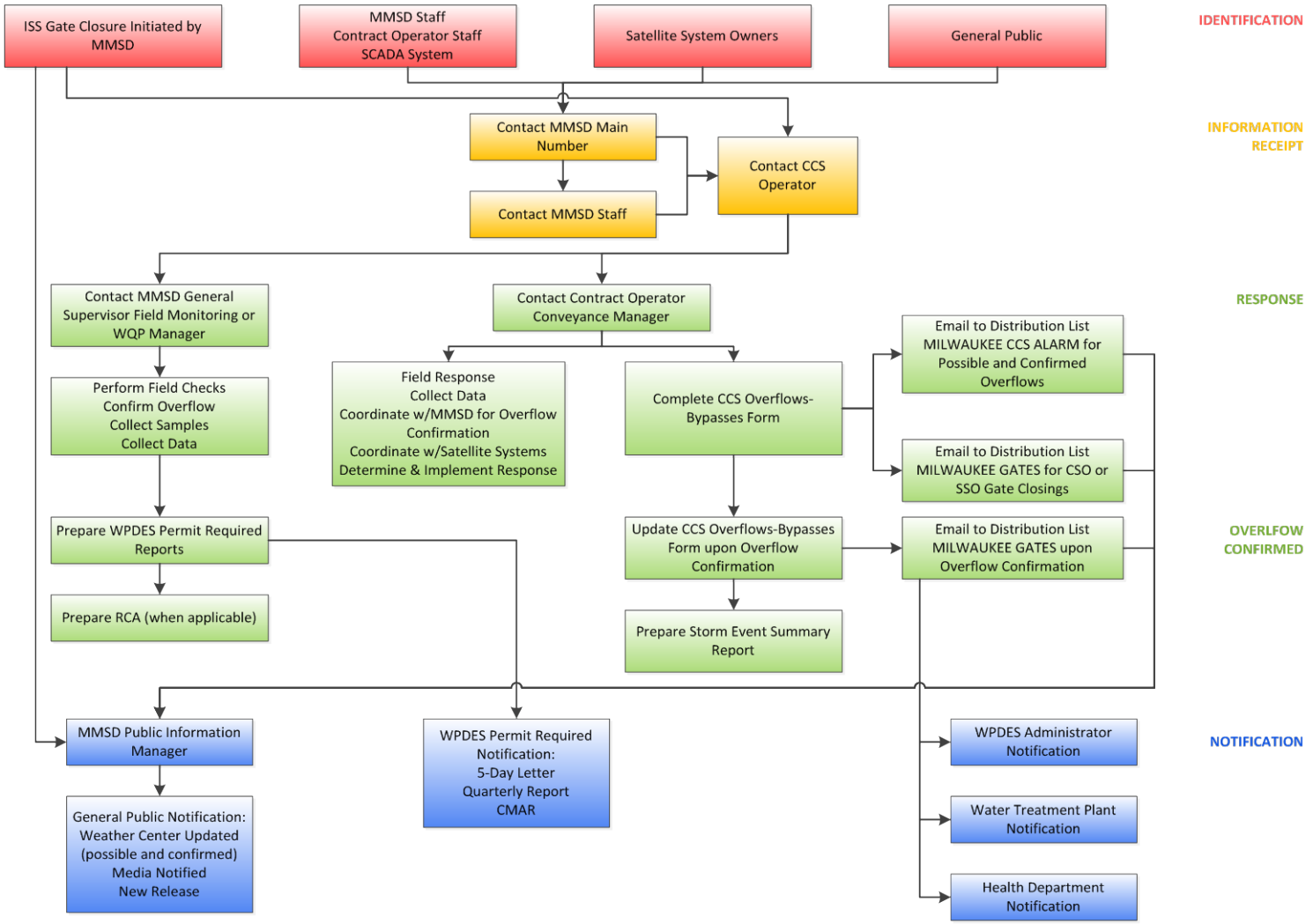
4-5 DISTRICT OVERFLOW RESPONSE PLAN GRAPHICAL REPRESENTATION



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4-6 CCS OVERFLOWS/BYPASSES FORM

VEOLIA WATER

CCS Overflows/Bypasses

Operator's Name Jacob Holbert **Date of Overflow Alarm:** 3/18/14 **Time of Alarm:** 12:38

COMMENTS:

VWM performing a routine PM caused a BYPASS message to be displayed. This is a FALSE BYPASS, no wastewater was discharged.

Status Update: Operator's Name: _____ **Date:** _____ **Time:** _____

COMMENTS:

☒ **Possible Overflow/Bypass** *E-MAIL TO: MKE CCS Alarm*

☐ **CSO Gates Close**

☐ **Confirmed Overflow/Bypass** *E-MAIL TO: MKE Gates*

☐	BS0302	106th & Fisher	☐	CT02	Hawley Road and State Street
☐	BS0303	74th and Oklahoma	☐	CT0304	44th and Wells
☐	BS0401	Honey Creek and Wisconsin	☐	CT0506	25th & Menomonee River
☐	BS0405	59th & State (CSO)	☐	CT07	16th and Canal
☐	BS0501	Richards and Congress (CSO)	☐	CT08	3rd and Seeboth
☐	BS0502	32nd and Hampton (CSO)	☐	NS04	Cambridge and Providence
☐	BS0503	35th and Roosevelt	☐	NS05	Burleigh and Milwaukee River
☐	BS0505	27th and Villard	☐	NS06	Park Place & Milwaukee River
☐	BS0506	Range Line & Milwaukee River	☐	NS07	Commerce and Booth
☐	BS0507	46th & State	☐	NS08	Commerce and Walnut
☐	BS0601	35th and Manitoba	☐	NS09	3rd and Juneau
☐	BS0602	KK and St. Francis	☐	NS10	Water and St. Paul Street
☐	BS0701	Bruce and Water	☐	NS11	Humboldt and Capitol Drive
☒	DC0103	6th and Oklahoma East (CSO)	☐	NS12	31st and Capitol Drive
☐	PS0402	Lake Dr. and Ravine	☐	KK01	6th and Cleveland
☐	PS0502	Green Tree Road	☐	KK02	1st and Chase
☐	MS0409	9523 N Broadmoor	☐	KK03	4th and Becher
☐	MS0508	Lydell & Montclair	☐	KK04	1st and Lincoln
☐	NS03	(Pillsbury Silos)4400 N. Port Washington	☐	LMS	Lincoln Memorial Drive & Russell
☐	DS145A	28th & Nash	☐	LMN	2211 S. Bay
			☐	BS0801	2nd and Seeboth (EWWE)

☐ ISS CSO Gates Close (Time _____)

☐ ISS SSO Gates Close (Time_____)

See Distribution List on Page 2

File M1456 04/17/13

VEOLIA WATER

CCS Overflows/Bypasses

CCS Overflows/Bypasses Electronic Distribution List:

MKE CCS Alarm Members:

Theera Ratarasarn (DNR)
CCS Operators
Mark Eigner
Bob Gassenhuber
Bill Graffin
Michelle Helm
Bob Hines
John Kittelson
Joe Leszczynski
Kevin Lyons
Matt Maccoux
Matt Magruder
Sharon Mertens
Paul Noran
Pat Obenauf
Mitch Olds
Deb Plears (VW File)
Bob Rebitski
Neal Rehse
Scott Royer
Beth Sauer
Jeff Schilling
Chris Schultz
Mary Singer
Kurt Spieker
Alex Szarzynski
Choo Teoh
Pete Topczewski
Mike Wojtanowski
Dave Wozniak

MKE Gates Members:

Steve Greb (DNR)
Xiaochun Zhang (DNR)
Paul Biedrzycki (Milw Health Dept)
Lindor Schmidt (Milw Health Dept)
Terri Linder (Milw Health Dept)
Kyle McFatridge (Milw Health Dept)
Jose Rivera Rodriguez (Milw Health Dept)
John Bielinski (Milw Water Works)
Lon Couillard (Milw Water Works)
Laura Daniels (Milw Water Works)
Anthony Jackson (Milw Water Works)
Carrie Lewis (Milw Water Works)
Martin Moyer (Milw Water Works)
Dan Welk (Milw Water Works)
Frank Miller (Cudahy Water Utility)
Eric Kiefer (North Shore WC)
Pat Francis (Oak Creek Water Works)
Doug Fischer (So. Milw Water Works)
Dr. Sandra McLellan (UWM)
Deb Dila (UWM)
Amber Koskey (UWM)
Austin Baldwin (USGS)
Steven Corsi (USGS)
Steve Jacquart
MKE CCS Alarm Group
MKE Shift Supervisors

File M1456 04/17/13

4-7 MON-SPVS-070

MILWAUKEE METROPOLITAN SEWERAGE DISTRICT
Systems Monitoring Procedures

Overflow/Bypass and In-plant Diversion Notification Procedure

Procedure Number:	MON-SPVS-070	**Effective Date:**	April 21,2014
Prepared by:	PSW	**Rev History:**	June 23, 2006 April 21, 2014
Procedure Description:	MMSD's conveyance system and tunnel operations are governed by a number of regulatory and public notification and investigation requirements. This procedure summarizes standard notification/documentation requirements.		
Procedure Responsibility:	Veolia Water Console Operator MMSD General Supervisor Field Monitoring Veolia Water On Call Field Supervisor		

Attachments	
Attachment A	CCS Overflows-Bypasses Form
Attachment B	Notification Distribution List (Veolia Water only)

Definitions

Background

Overflows or bypasses can contaminate water and need to be investigated. There is also a need for some companies and agencies to take protective actions in these events.

This procedure is shared between MMSD and Veolia Water

SAFETY
These notifications affect public safety and need to be done promptly, precisely and professionally.

Procedures

The following events require the listed notifications by the Veolia Water Console Operator. If there are questions or problems with any of the notifications, the on-call MMSD General Supervisor Field Monitoring should be promptly contacted.

1) Possible Combined Sewer Overflow or MIS bypass.

Whenever a bypass/overflow alarm indicates a possible combined sewer overflow or MIS

bypass the following steps must occur:

a) Contact on-call MMSD General Supervisor Field Monitoring immediately (unless otherwise instructed). You need to talk directly with this supervisor.

- If you cannot talk directly with the on-call supervisor, then you must contact the alternate General Supervisor Field Monitoring.
- If that supervisor is not available, you must contact the Water Quality Protection Manager.

b) Contact Veolia Water Conveyance Manager

c) Complete and distribute a "CCS Overflows-Bypasses" form (see *Attachment A*). *Note: In the comment field, insert any pertinent information.*

- Save the document on the shared drive, under Operations/CCS Operators Logs/(year), using the current date in the document name – *CCS overflows-bypasses 02-02-06.doc.*
- E-mail the "CCS Overflows-Bypasses" document as an attachment to the "Milwaukee CCS Alarm" distribution list (see *Attachment B*).

2) CSO or SSO Gate Closings

a) Contact the on-call MMSD General Supervisor Field Monitoring.

b) Contact the Veolia Water Conveyance Manager .

3) Confirmed Overflow/Bypass

Whenever confirmation of a bypass or overflow is received from the MMSD management, the appropriate notifications and documentation must be distributed. Even if there has been prior notification of a possible bypass or overflow, a second, updated form must be distributed using the following procedure.

a) Contact the on-call MMSD General Supervisor Field Monitoring (unless this is the source of the confirmation).

b) Contact the Veolia Water Conveyance Manager.

c) Complete and distribute a "CCS Overflows-Bypasses" form. *Note in the comment field the source of the confirmation.*

- Save the document on the shared drive, under Operations/CCS Operators Logs/(year), using the date in the document name – *CCS overflows-bypasses 02-02-06.doc.*
- E-mail the "CCS Overflows-Bypasses" document as an attachment to the "Milwaukee Gates" distribution list.

Attachment A – CCS Overflows/Bypasses Form

VEOLIA WATER

CCS Overflows/Bypasses

Operator's Name	Pat Kober	Date of Overflow Alarm:	4/18/14	Time of Alarm:	08:17

COMMENTS:
False alarm, Field Crew doing a P.M.

Status Update: Operator's Name:		Date:		Time:	

COMMENTS:

☒ **Possible Overflow/Bypass** *E-MAIL TO: MKE CCS Alarm* ☐ **CSO Gates Close** ☐ **Confirmed Overflow/Bypass** *E-MAIL TO: MKE Gates*

☐	BS0302	106th & Fisher	☐	CT02	Hawley Road and State Street
☐	BS0303	74th and Oklahoma	☐	CT0304	44th and Wells
☐	BS0401	Honey Creek and Wisconsin	☐	CT0506	25th & Menomonee River
☐	BS0405	59th & State (CSO)	☐	CT07	16th and Canal
☐	BS0501	Richards and Congress (CSO)	☐	CT08	3rd and Seeboth
☐	BS0502	32nd and Hampton (CSO)	☐	NS04	Cambridge and Providence
☐	BS0503	35th and Roosevelt	☐	NS05	Burleigh and Milwaukee River
☐	BS0505	27th and Villard	☐	NS06	Park Place & Milwaukee River
☒	BS0506	Range Line & Milwaukee River	☐	NS07	Commerce and Booth
☐	BS0507	46th & State	☐	NS08	Commerce and Walnut
☐	BS0601	35th and Manitoba	☐	NS09	3rd and Juneau
☐	BS0602	KK and St. Francis	☐	NS10	Water and St. Paul Street
☐	BS0701	Bruce and Water	☐	NS11	Humboldt and Capitol Drive
☐	DC0103	6th and Oklahoma East (CSO)	☐	NS12	31st and Capitol Drive
☐	PS0402	Lake Dr. and Ravine	☐	KK01	6th and Cleveland
☐	PS0502	Green Tree Road	☐	KK02	1st and Chase
☐	MS0409	9523 N Broadmoor	☐	KK03	4th and Becher
☐	MS0508	Lydell & Montclair	☐	KK04	1st and Lincoln
☐	NS03	(Pillsbury Silos)4400 N. Port Washington	☐	LMS	Lincoln Memorial Drive & Russell
☐	DS145A	28th & Nash	☐	LMN	2211 S. Bay
			☐	BS0801	2nd and Seeboth (EWWE)

☐ ISS CSO Gates Close (Time)
☐ ISS SSO Gates Close (Time)

See Distribution List on Page 2

File M1456 03/05/14

App 4-7 MON-SPVS-070.docx *Page 3 of 4*

Attachment B – Notification Distribution List

VEOLIA WATER

CCS Overflows/Bypasses

CCS Overflows/Bypasses Electronic Distribution List:

MKE CCS Alarm Members:

Theera Ratarasarn (DNR)
CCS Operators
Mark Eigner
Bob Gassenhuber
Bill Graffin
Michelle Helm
Bob Hines
John Kittelson
Joe Leszczynski
Kevin Lyons
Matt Maccoux
Matt Magruder
Sharon Mertens
Paul Noran
Pat Ohnemuf
Mitch Olds
Deb Plears (VW File)
Bob Rebitski
Neal Rehse
Scott Royer
Beth Sauer
Jeff Schilling
Chris Schultz
Mary Singer
Kurt Spieker
Choo Teoh
Pete Topczewski
Mike Wojtanowski
Dave Wozniak

MKE Gates Members:

Steve Greb (DNR)
Xiaochun Zhang (DNR)
Paul Biedrzycki (Milw Health Dept)
Lindor Schmidt (Milw Health Dept)
Terri Linder (Milw Health Dept)
Kyle McFatridge (Milw Health Dept)
Jose Rivera Rodriguez (Milw Health Dept)
John Bielinski (Milw Water Works)
Lon Couillard (Milw Water Works)
Laura Daniels (Milw Water Works)
Anthony Jackson (Milw Water Works)
Carrie Lewis (Milw Water Works)
Martin Moyer (Milw Water Works)
Dan Welk (Milw Water Works)
Frank Miller (Cudahy Water Utility)
Eric Kiefer (North Shore WC)
Pat Francis (Oak Creek Water Works)
Doug Fischer (So. Milw Water Works)
Dr. Sandra McLellan (UWM)
Deb Dila (UWM)
Amber Koskey (UWM)
Austin Baldwin (USGS)
Steven Corsi (USGS)
Steve Jacquart
MKE CCS Alarm Group
MKE Shift Supervisors

File M1456 03/05/14

4-8 REQUEST FOR ASSISTANCE FORM

VEOLIA WATER

Request For Assistance Form

Work Request # _____

Date	Time of Call	Call Taken By

Name of Caller

Company or Agency

Telephone Number

Address or Major Intersection

City

Please check your location →

- ☐ Jones Island
- ☐ South Shore
- ☐ 13th & College
- ☐ Field Maintenance

Please fill in the information concerning the Type of call received below:

Spills, Chemical, Petroleum, Illegal Dumping

Call:

☐ MMSD Industrial Waste Pager		990-9347(Chris)
	or	990-9957(Andy)
☐ Veolia Water Safety Dept Cell Phone		841-1494
☐ Field Operations on call supervisor		(see current list)
☐ Shift Supervisor (both plants)		747-3836

SPILLS

Type of Spill	Date of Spill	Time of Spill	Who Spilled	Spilled to:
☐ General _____ ☐ Chemical ☐ Petroleum ☐ Illegal Dumping				☐ Sanitary Sewer ☐ Storm Sewer ☐ Waterway ☐ Other _____

Chemical Description	Volume or Weight	Duration

OTHER

Construction Related	Injury/Damage/Security	Water Course Problems	Water Reported
☐ Construction Site Problem ☐ Manhole Lid Problem ☐ Traffic Barricade	☐ Serious Injury Reported ☐ Property Damage ☐ Security Issue	☐ Water course blockage ☐ Water course graffiti ☐ Other _____	☐ Water in basement ☐ Water in Street

Odor or Noise	Employee Behavior	Request for Information-Radio/TV/Newspaper
☐ Odor Reported ☐ Noise Problem	☐ Employee Behavior (Describe below)	Refer calls to Scott Royer (747-3851) during normal business hours.

COMPLAINT

ACTION TAKEN

Return this form to Debbie Guzlecki.

03/04/08 ERF-001

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4-9 MON-SPVS-060

MILWAUKEE METROPOLITAN SEWERAGE DISTRICT
Field Monitoring Procedures

Wet Weather Procedure

Procedure Number:	MON-SPVS-060	**Effective Date:**	April 17, 2014
Prepared by:	PSW	**Rev. History:**	April 17, 2014 January 20, 2010 March 25, 2009 May 2, 2008 August 27, 2007 September 8, 2006 January 27, 2005
Procedure Description:	This procedure describes monitoring and sampling activities to be assigned during various wet weather events.		
Procedure Responsibility:	General Supervisor - Field Monitoring		
Procedure Purpose:	To ensure the proper wet weather activities are performed by Field Monitoring Department staff.		

Attachments	
Attachment A	Wet Weather Notification Protocols
Attachment B	Separate Sewer Overflow (SSO) Verification Checklist
Attachment C	Wet Weather Contacts/Phone Numbers
Attachment D	Inline Storage System (ISS) Groundwater Monitoring Sites
Attachment E	Northwest Side Remote Storage (NWSRS) Standpipe Locations

Definitions

•

Background

The Field Monitoring Department must perform special data and sampling collection activities during the following wet weather scenarios:

1. Storm event with at least 0.75" precipitation within a given 24-hour period
2. 50 million gallons or greater volume in the Inline Storage System (ISS) (aka: Deep Tunnel)
3. 300 million gallons or greater volume in the Inline Storage System (ISS) (aka: Deep Tunnel)
4. 60 million gallons or greater volume in the Northwest Side Remote Storage (NWSRS)
5. Potential Isolated Separate Sewer Overflow (SSO) or Combined Sewer Overflow (CSO) (Note: For Verification)

1

6. Any precipitation-related CSO or SSO activity

7. ISS overfill event

In addition to the above scenarios, the General Supervisor - Field Monitoring should schedule stormwater sampling as appropriate based on a storm's precipitation amount/intensity and the current guidelines of the Stormwater Monitoring Program, along with the collection of USGS Real-Time WQ samples as directed by USGS staff.

This procedure outlines the data collection and sampling activities that must be assigned to Field Monitoring crews during each of these wet weather scenarios.

For guidance regarding collecting samples for the Stormwater Monitoring Program refer to *MON-STORM-030, Investigative Stormwater Sampling*.

Procedures

The General Supervisor Field Monitoring , unless noted within each item, shall assign the following tasks to Field Monitoring staff as necessary:

Rain Event (0.75"within a given 24-hour period)

Note: - This is a Wisconsin Pollutant Discharge Elimination System (WPDES) permit-required activity

Assign the following tasks when at least **0.75"** precipitation falls within a given 24-hour period:

1. Regulatory Surcharge Level Indicator (SLI) route.

2. Regulatory flow monitoring routes (north and south). Note: – The Regulatory SLI route is contained within the north and south Regulatory flow monitoring routes.

3. Other SLI routes may be assigned as well, depending on rain intensity; the Systems Monitoring Department will advise.

If readings indicate that there may have been CSO or SSO activity, notify the appropriate personnel as outlined in the Wet Weather Notification Protocols (*Attachment A*).

MON-SPEC-050, Conducting SLI Readings contains instructions for field crews on how to conduct SLI readings.

300 million gallons or greater volume in the ISS (aka: Deep Tunnel)

Note: - This is a WPDES permit-required activity.

Assign the following activities whenever ISS volume is 300 million gallons or greater:

1. Download all District piezometer and data logger level data and take level measurements at all standpipes within 72 hours (see Attachment D).

2. Sample the (26) ISS groundwater wells, (see Table A) and (2) NWSRS groundwater wells as soon as possible after the ISS has been pumped out to a volume of 50 million gallons or less (See Table B).

2

50 million gallons in the ISS (aka: Deep Tunnel) at start of workday

Note: - This is not a WPDES permit-required condition

Suspend sampling at all groundwater wells. Use professional judgment at start of workday to direct sampling activities where ISS is storing < 50 million gallons and weather forecast predicts additional precipitation (i.e. consider potential for reaching 50 million gallons). Sampling activities include purging of the well, as this lowers the piezometric head in these wells which increases the potential for exfiltration from the ISS. All scheduled groundwater level measurements should be completed.

Refer to *MON-GW-050, Collecting VWP Measurements* and *MON-GW-030, Collecting Standpipe Piezometer Measurements* for specific details).

60 million gallons or greater volume in the NWSRS

Note: - This is a WPDES permit-required activity.

Assign the following activity whenever NWSRS volume is 60 million gallons or greater:

1. Download level data from the (3) data logger wells (see Attachment E).
2. Take level measurements at all NWSRS locations (see Attachment E).
3. Sample the (2) NWSRS groundwater wells (see Table B) after the NWSRS has been completely drained. (see Table B)

Potential Isolated SSO or CSO Verification

Note: - This is a WPDES permit-required activity

For a possible SSO, perform the activities outlined in the SSO Verification Checklist (*Attachment B*). If an SSO or CSO is confirmed, follow the notification protocol as outlined in *Attachment A*.

Any precipitation-related CSO or SSO activity

Note: - Items 1, 2, and 3 below are WPDES permit-required activities.

Assign the following sampling whenever there is any full scale precipitation-related CSO or SSO activity:

1. Collect ISS samples from sites where bypassing has occurred (ASAP). IF no sample and CSO is verified by high water marks, debris or other evidence a grab sample should be taken.
2. Check special SSO samplers and collect samples if necessary (ASAP)
3. Download data from all regulatory (north & south) flow monitoring routes (ASAP)

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4. Sample the (26) ISS groundwater wells (see Table A) as soon as possible after the ISS has been pumped out at the start the workday to a volume of 50 million gallons or less. Again, use professional judgment if more precipitation is forecasted, to reduce conditions that would induce exfiltration from the ISS.

5. Sample the (2) NWSRS groundwater wells (see Table B) after the NWSRS has been completely drained. .

6. Collect readings on all SLI routes (To be performed following completion of items 1 thru 5.)

7. River Level Indicator (RLI) routes at the request of the Conveyance Systems Data Coordinator

TABLE A
Twenty-six ISS Groundwater Wells To Be Sampled
(see MON-GW-010, Collecting Groundwater Well Samples for specific details)

ISS Groundwater Quality Monitoring Locations (26)			
Well Number	**GW ID**	**Station**	**Groundwater Location**
819	03D	NS-MR-03D	MORRIS & BEVERLY SHOREWOOD GARAGE(DEEP)
821	04D	NS-MR-04D	N.NEWHALL & E. PARK PL.(DEEP)
801	06D	CT-MR-06D	S.19th ST. & POTOWATOMI CIRCLE (DEEP)
831	08D	CT-MR-08D	SHERMAN BLVD., S. OF W. CHAMBER ST.(DEEP)
832	08S	CT-MR-08S	SHERMAN BLVD.,S. OF W. CHAMBERS ST.(SHALLOW)
804	C03	CT-MW-03	40' S. OF CANAL ST. & 450' W. OF S. 6TH ST.
805	C04	CT-MW-04	EMBER LA., SW OF W. CANAL ST.
809	C08	CT-MW-08	W. STATE ST., 250 E. OF N. 60TH ST.
810	C09	CT-MW-09	SE OF HARWOOD AVE. IN WAUWATOSA MUN PARKING LOT
887	C25	CT-MW-25	MENOMONEE RIVER PKWAY & CHARLES HART PKWY
888	C26	CT-MW-26	ON JONES ISLAND, EAST OF WELL C01 BY CLARIFIER #1
826	K01	KK-MW-01	EAST OF GREENFIELD AVE & GREAT LAKES R.F.
827	K02	KK-MW-02	W. MAPLE ST. AT S.1ST ST.
828	K03	KK-MW-03	30' W. OF S. 1ST ST., 48' N. OF W. LINCOLN AVE.
829	K04	KK-MW-04	W. ROSEDALE AVE. & 95' W. OF I-94 OVERPASS
830	L01	LM-MW-01	LINCOLN MEMORIAL DRIVE
811	N01	NS-MW-01	N. 3RD ST., W. OF ST PAUL AVE.
812	N02	NS-MW-02	W. HIGHLAND AVE. & N. 3RD ST.
813	N03	NS-MW-03	E. VINE ST, W. OF N. HUBBARD ST.
814	N04	NS-MW-04	N .COMMERCE ST,1200'NE OF HOLTON VIADUCT
817	N07	NS-MW-07	4150 N. HUMBOLDT BLVD.
823	N09	NS-MW-09	LINCOLN PARKWAY, 750 SW OF I-43 OVERPASS
824	N10	NS-MW-10	W. HAMPTON AVE., 90'W OF N.22ND ST.
825	N11	NS-MW-11	3025 W. RUBY AVE. (CITY OF MILW. GARAGE PARK LOT)
889	N19	NS-MW-19	N. 30TH & HAMTPON AVE.
890	N20	NS-MW-20	S. MILL RD. AND SYDNEY PLACE EXT'D.

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TABLE B
Two NWSRS Groundwater Wells To Be Sampled
(see MON-GW-010, Collecting Groundwater Well Samples for specific details)

NWSRS GROUNDWATER QUALITY MONITORING LOCATIONS (2)			
Well Number	MMSD ID	Site ID	Location
884	G10	GM-IR-10	107TH & SHERIDAN AVE.
885	G11	GM-IR-11	HWY 100 & COURTLAND EXT'D.

***Suspend sampling if ISS volume >= 50 million gallons or could potentially rise to 50 million gallons during the work day.**

ISS Overfill Event

Note: - This is a WPDES permit-required activity

Confirmation of an ISS overfill event will be made by the Water Resources Program Supervisor, Conveyance Systems Monitoring Supervisor, or Water Quality Team Protection Director. Upon confirmation, assign the following:

1. There are no additional monitoring required unless specifically directed by Water Resources Program Supervisor or the Director of Water Quality Protection. Permit monitoring requirements are fulfilled under the ISS event protocols i.e., ISS>= 300 million gallons and NWSRS >= 60 million gallons.

Stormwater Sampling

Refer to *MON-STORM-030, Investigative Stormwater Sampling* for details.

In addition, follow the notification protocol as outlined in *Attachment A and the Annual Stormwater Program Document.*

USGS Real-Time WQ Samples

Refer to *MON-SAMP-230, Collecting USGS Real-Time WQ Samples*

This SOP would need to be created and referenced in this document if it is determined to be an activity that needs to be performed as a part of these activities.

In addition, follow the notification protocol as outlined in *Attachment A*.

River Level Indicators

Refer to *MON-SPEC-110, River Level Indicators*, for details.

River level indicator routes should be read once per month (March through November), and other cases as directed by the Freshwater Resources Monitoring Supervisor. River level indicator routes will be read after CSO events as time permits and it can be safely accomplished. RLI's should be reset in preparation for the next possible event.. Additional

readings may be requested by the Freshwater Resources Monitoring Supervisor or the Director of Water Quality Protection for other extreme wet weather events.

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Attachment A
Wet Weather Event Notification Protocols

The Monitoring on-call Supervisor is responsible for notifying the appropriate individuals after assigning the following wet weather activities. The Water Quality Senior Project Manager should be notified in all situations listed below.

Storm Event Monitoring Data Collection

If readings from these routes indicate that there may have been CSO or SSO activity, then the following notifications should occur:

1. Forward data to Conveyance System Data Coordinator or Water Resources Program Supervisor.

2. Notify Director of Water Quality Protection (can also be done by Conveyance System Data Coordinator or Water Resources Program Supervisor).

3. If CSO or SSO activity is verified, follow the *Precipitation-Related CSO or SSO Activity* notification protocol, below.

Precipitation-Related Groundwater Sampling

1. Email Water Resources Programs Supervisor or designee.

2. Call Lab Manager or Lab On-Call Supervisor to inform them that samples will be delivered.

Precipitation-Related CSO or SSO Activity

1. Immediately call Director of Water Quality Protection or designee.

2. Call Fresh Water Resources Monitoring Supervisor.

3. Call Lab Manager or Lab On-Call Supervisor to inform them that samples will be delivered.

4. On Weekends, Water Resources Programs Supervisor or Conveyance Systems Data Coordinator cell phone.

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5. Upon verification of an SSO, Conveyance Systems Data Coordinator will tell the CCS Operator to send out the *Confirmed Overflow/Bypass* notification. The CCS operator will send out the *Confirmed Overflow/Bypass* notification for CSOs upon closure of the CSO gates to the ISS.

Stormwater Sampling

1. Call Lab Manager or Lab On-Call Supervisor to inform them that samples will be delivered.

2. Call Deb Dila, or Sandra McLellan at the UWM-GLWI.

3. Call or email Water Resources Program Supervisor.

USGS Real-Time WQ Sampling

1. Call Lab Manager or Lab On-Call Supervisor to inform them that samples will be delivered.

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Attachment B

CSO and SSO Location Checklist

LOCATION	METER TYPE	CONDITION FOR POSSIBLE OVERFLOW	SLI I.D.
79th & Dickinson BS0304	2150	Negative Flow	N/A
79th & Dickinson	SLI ONLY	SLI Up	MIS09020
106th & Fisher Pkwy. (1/2 Bock West SSO233)	SLI ONLY	SLI Up	SPWA01 Bottom
106th & Fisher Pkwy. (1/2 Bock West SSO233)	SLI ONLY	SLI Up	SPWA01A Top
106th & Fisher Pkwy. SSO233/BS0302	SLI ONLY	SLI Up	233
28th & Hopkins NS12	SLI ONLY	SLI Up	CSO145AS
N. 31st St & W. Capitol Dr BS0502	SLI ONLY	SLI Up	CSO145S
31st & Fairmount SSO207/BS0511	2150 SLI	Negative Flow SLI Up	207
31st & Fairmount BM0511	2150	Level Greater than 2.5'	N/A
N. 31st and Lancaster	SLI ONLY	SLI Up	CKB511
27th & Villard BS505	SLI ONLY	SLI Up	80021
27th & Silver Spring SS209A/BS0514	2150 SLI	Negative Flow SLI Up	209A
Lydell & Montclaire SSO245/BS0513	2150 SLI	Negative Flow SLI Up	245
Lydell & Montclaire BM0513	2150	Level Greater than 4'	N/A
Green Tree Pump Station (in grated vert. overflow) BS0404/PS0502	SLI ONLY	SLI max reading	PS52E/PS52W
Broadmoor & CNW RR MS0409	SLI ONLY	SLI Up	206
Lake & Ravine Overflow SSO264/PS0402	SLI ONLY	SLI Up	264
Howell S. of Grange Ave.	SLI ONLY	SLI Up	220
1st & KK Rvr.(DAM)	SLI ONLY	SLI Up	CSO019
Water St. & Bruce St.	SLI ONLY	SLI Up	250
Bruce St. & Water St.	SLI ONLY	SLI Up	CSO143
8th & Canal St.	SLI ONLY	SLI Up	CSO010
Marshall & Milw. Rvr.(Ext.)	2150	Positive Flow	CSO015
N. of 3rd St. & Vliet St.	SLI ONLY	SLI Up	MIS0606
Vliet St. E of N. 3rd St.	2110	Positive Level	CSO016
45th & State St.	SLI ONLY	SLI Up	BS0507
46th & State St.	SLI ONLY	SLI Up	229
Honeycreek & Portland C80031	2150 SLI	Level greater than 4' SLI Up	234
S. 43rd & Lincoln Ave. SSO243	2150	Positive Level with Negative Velocity	243
Wisconsin & Honeycreek	SLI ONLY	SLI Up	CKBS41

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Attachment C
Wet Weather Contacts / Phone Numbers

Effective: January 20, 2010

Title	Name	Work Phone	Home Phone
Director of Water Quality Protection	Pete Topczewski	Office 225-2176 Cell 617-1552	215-7303
Conveyance System Data Coordinator	Joe Leszczynski	Office 225-2232 Cell 617-1264	262-894-2885
Lab Manager	Sharon Mertens	Office 277-6384 Cell 235-1325	855-0776
Lab On-Call Supervisor	Varies according to schedule	Cell 617-1432	
Water Resource Programs Supervisor	Mary Singer	Office 225-2074 Cell 870-0114	
Fresh Water Resources Monitoring Supervisor	Beth Sauer	Office 277-6388 Cell 265-6702	Personal Cell 847-830-7665
Water Quality Senior Project Manager	Chris Schultz	Office 225-2217 Cell 617-1879	764-0314
Public Information Officer	Bill Graffin	Office 225-2077 Cell 510-6832	423-1613
UWM-Great Lakes Water Institute mclellan@uwm.edu dila@uwm.edu	Sandra McLellan Deb Dila	Office 382-1710 Cell 430-2228 Office 382-1747	967-4774

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Attachment D
Inline Storage System (ISS) Groundwater Monitoring Sites, page 2 of 2

GW ID	Station	Measurement Type	Groundwater Location
K05	KK-MW-05	PDL	E. GREENFIELD AVE. & GREAT LAKES R.F.
K07	C44-PZ-06	S	W. BECHER ST., E. OF S. 4TH ST.
K08	C10-07-KK	S	S. 1ST ST. BETWEEN LINCOLN AVE. & CHASE AVE.
L01	LM-MW-01	WPDL	LINCOLN MEMORIAL DRIVE
L02	C10-32-KK	S	E. LINCOLN AVE. & S. MOUND ST.
N01	NS-MW-01	WPDL	N. 3RD ST., W. OF ST PAUL AVE.
N02	NS-MW-02	WPDL	W. HIGHLAND AVE. & N. 3RD ST.
N03	NS-MW-03	WPDL	E. VINE ST, W. OF N. HUBBARD ST.
N04	NS-MW-04	WPDL	N .COMMERCE ST,1200'NE OF HOLTON VIADUCT
N05	NS-MW-05	P	N. OF BELLEVIEW PL., W. OF C & NW R.R.
N06	NS-MW-06	P	N. CAMBRIDGE AVE., S. OF E. HARTFORD AVE.
N07	NS-MW-07	WPDL	4150 N. HUMBOLDT BLVD.
N08	NS-MW-08	PDL	RIVER WOODS PARKWAY AND MILWAUKEE RIVER
N09	NS-MW-09	WPDL	LINCOLN PARKWAY, 750 SW OF I-43 OVERPASS
N10	NS-MW-10	WPDL	W. HAMPTON AVE., 90'W OF N.22ND ST.
N11	NS-MW-11	WPDL	3025 W. RUBY AVE. (CITY OF MILW. GARAGE PARK LOT)
N12	PZ-NS9-DS	S	PARKING LOT AT NS9 SOUTH OF DROPSHAFT CHANNEL
N13	I30-10-NS	S	N. COMMERCE ST. ADJACENT TO NS7
N14	I30-07-NS	S	E. CHAMBERS & MILWAUKEE RIVER
N15	I48-PZ-01	S	N. LYDELL AVE. & MARNE AVE.
N16	130-02-NS1	S	N. 32ND ST. & W. HAMPTON AVE.
N17	130-02-NS2	S	N. 32ND ST. & W. HAMPTON AVE.
N18	I36-PZ-04	S	N. 2ND ST. & W. ST PAUL AVE.
N19	NS-MW-19	WPDL	N. 30TH AND HAMPTON AVE.
N20	NS-MW-20	WPDL	S. MILL RD. AND SYDNEY PLACE EXT'D.
N21	WA-3N	S	Private Property W. of Hampton Ave. (deep well)
N22	WA-2B	S	NE Corner of W. Mill Rd and N. Sidney Place
N23	WA-AL-3	S	N. 27th and W. Custer
N24	WA-AL-4	S	N. 27th and W. Reichert
N25	WA-AL-5	S	N. 27th St and W. Bobolink
N26	WA-AL-6	S	N. 27th St. Ext'd (Aldrich Chemical Co.)

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Attachment E
Northwest Side Remote Storage (NWSRS) Locations

MMSD ID	SITE ID	Measurement Type*	Location
G01	NWSR-1	S	Denver site; W. of 91st., S. of Denver Ave.(7.5' S.E. of P8) Started
G14	NWSR-14	S	Fond du Lac Ave. and Mill Rd. just N.E.
G16	NWSR-16	S	750' N. of Appleton Ave. on Menomonee River Parkway
G03	NWSR-3	S	E. of Menomonee River Parkway on Appleton Ave. E. of the river
G18	NWSR-18	S	209' S. of Silver Spring Dr. on bike path W. of Menomonee River
G19	NWSR-19	S	835' S. of Silver Spring Dr. on bike path W. of Menomonee River
G06	SHEA-P-6	S	Hwy 100 S. of Hampton Ave. S. of odor structure(2' S. of 5)
G34	NWSR-34	S	Hwy 100 S. of Hampton Ave. W. of G11 well
G20	NWSR-20	S	Menomonee River Parkway, N. of Congress St. on bike path
G22	NWSR-22	S	38' E. of Menomonee River Parkway S. of Capitol Dr.
G09	NWSR-9	S	114' N. of Menomonee River Parkway on Hwy. 100
G100	NWSR-10	S	E. of Menomonee River Parkway on Auer Ave.
G26	NWSR-26	S	Menomonee River Parkway and Tower View Blvd.
G110	NWSR-11	S	35' S. of Ridge Blvd. on Menomonee River Parkway
G28	NWSR-28	S	96th St. W. side of Menomonee River Parkway
G29	NWSR-29	S	S. of Jackson Park Blvd. and W. of Menomonee River Parkway
G120	NWSR-12	S	NE. corner of Menomonee River Parkway and Swan Blvd.
G31	NWSR-31	S	County Grounds CT-1 site
G10	GM-IR-10	WPDL	107th and Sheridan Ave.
G11	GM-IR-11	WPDL	Hwy 100 and Courtland ext'd.
G12	GM-IR-12	PDL	Bluemound Country Club

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4-10 SOC-CA-01

MILWAUKEE METROPOLITAN SEWERAGE DISTRICT
Contract Administration and Compliance Procedures

Storm Event Analysis Procedure

Procedure Number:	SOC-CA-01	**Effective Date:**	March 1, 2014
Category:	Contract Administration	**Revision History:**	April 25, 2000
Emphasis:	System Operations & Control	**Prepared by:**	PSW
Description:	This procedure outlines the process to be followed when analyzing Storm Event Summary Reports submitted by the contract operator.		
Responsibility:	It is the responsibility of the Conveyance Contract Administrator to analyze the Storm Event Summary Reports that are submitted by the contract operator.		
Purpose:	An analysis of each Storm Event Summary Report is necessary to ensure that the contract operator responded properly to the storm event.		

REFERENCES		
Type	**Number**	**Description**
Attachments:	Attachment A	Rain Event Spreadsheet
	Attachment B	Storm Event Summary Report from the Contract Operator
Contract:	Schedule 4	Monthly Report, sections (o) and (p)
	Schedule 7	Wet Weather Protocol
File Code:	M1430	Tunnel Event Reports

DEFINITIONS

- **Rain Event**. Average total precipitation as measured by the MMSD rain gauges is greater than .05 inches and average intensity is greater than .05 inches/hour and inflow into tunnel greater than 30 MGD
- **Storm Event**. Any precipitation that results in a CSO and/or SSO
- **CSO**. Combined sewerage overflow
- **SSO**. Separate sewerage overflow
- **MGD**. Million gallons per day

SOC-CA-01

BACKGROUND
The Manager of Contract Compliance should request that the contract operator prepare a Storm Event Summary Report any time a rain event results in a CSO and/or SSO. This Report includes a summary of the storm event, including start/stop date and time of precipitation, recorded precipitation, and a summary in hourly increments of tunnel volume, influent flows and pump flows. This Report is used by CCO staff to evaluate the contract operator's performance during rain events that result in a CSO and/or SSO. Note: Storm Event Summary Reports are not specifically defined as a contractual requirement; rather, they are considered part of the general reporting requirements.

PROCEDURES

1. It is the responsibility of the Conveyance Contract Administrator to track all rain events in the Rain Event spreadsheet (Attachment A), located on the Contract Compliance page of the District's Infonet.
2. If a rain event results in a CSO and/or SSO, the contract operator should submit a Storm Event Analysis Report within seven days of the CSO or SSO.
3. There are two types of reports that may be submitted by the contract operator:
   - If the CSO resulted from a rain event with less than 200 MGD entering the tunnel (an unusual occurrence), the contract operator should submit an abbreviated summary report.
   - All other CSOs and SSOs require a full 5-page Storm Event Summary Report (Attachment B).
4. The Conveyance Contract Administrator reviews the Storm Event Summary Report to confirm that the contract operator responded properly to the rain event. This may include reviewing data trends on the District's Collection System computer to confirm that the actions taken by the contract operator match their descriptions.
5. If the Conveyance Contract Administrator feels that the contract operator did not respond properly to the rain event, the Manager of Contract Compliance discusses the situation with the contract operator and may issue an Exception Report describing the Conveyance Contract Administrator's findings. Note: Typically, these findings are communicated verbally.
6. If an Exception Report is issued, the Secretary files the report as instructed in procedure MGMT-CA-02, Contract Records Management.

5-1 DISTRICT JURSIDICTIONAL WATERCOURSE SYSTEMS

Chapter 13 Appendix
Table 1
Kinnickinnic River and Tributaries

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Lyons Creek	Greenfield Milwaukee	W. Forest Home Avenue and W. Morgan Avenue	Kinnickinnic River, at S. 58th Street and Kinnickinnic River Parkway	1.2
Wilson Park Creek	Cudahy Greenfield Milwaukee Saint Francis	S. Whitnall Avenue, south of S. Nicholson Road	Kinnickinnic River, near S. 30th Street and W. Manitoba Avenue	6.1
Villa Mann Creek, main stem	Greenfield Milwaukee	I-894, east of S. 27th Street	Wilson Park Creek, near S. 20th Street and W. Plainfield Avenue	0.8
Villa Mann Creek, tributary	Greenfield Milwaukee	W. Colony Drive, east of S. 35th Street	Villa Mann Creek, east of S. 27th Street	0.7
43rd Street Ditch	Milwaukee West Milwaukee	W. Rogers Street and S. 50th Street extended	Kinnickinnic River, near S. 43rd Street and the railroad bridge	1
Kinnickinnic River, main stem	Greenfield Milwaukee	S. 58th Street and Kinnickinnic River Parkway	Estuary at S. Chase Avenue	5.7

Chapter 13 Appendix
Table 2
Lake Michigan Drainage Area

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Fish Creek, main stem	Bayside Mequon River Hills	W. County Line Road, east of I-43	Lake Michigan, north of the Milwaukee County/Ozaukee County border	2.2
Fish Creek, tributary	Bayside Mequon River Hills	W. County Line Road, near Columbia Court	Fish Creek at I-43	0.5

Chapter 13 Appendix
Table 3
Menomonee River and Tributaries

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Grantosa Creek, upper reach	Milwaukee Wauwatosa	W. Hampton Avenue, east of N 100th Street	N. 100th Street, north of W. Glendale Avenue	0.8
Grantosa Creek, lower reach	Milwaukee Wauwatosa	W. Grantosa Drive at N. 100th Street	Menomonee River, east of N. Mayfair Road, south of N. Menomonee River Parkway	0.3
Honey Creek	Greenfield Milwaukee Wauwatosa West Allis	S. 43rd Street near W. Edgerton Avenue	Menomonee River, near W. Honey Creek Parkway and N. 72nd Street	8.8
Little Menomonee River	Germantown Mequon Milwaukee	Border of Milwaukee and Ozaukee Counties at W. County Line Road, east of N. 107th Street	Menomonee River, near W. Hampton Avenue and N. Mayfair Road	6.9

Chapter 13 Appendix
Table 3
Menomonee River and Tributaries

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Menomonee River, main stem	Brookfield Butler Elm Grove Germantown Greendale Greenfield Menomonee Falls Mequon Milwaukee New Berlin Wauwatosa West Milwaukee	Border of Milwaukee and Ozaukee Counties, south of US-45	Estuary at S. 29th Street, extended	16
Schoonmaker Creek	Milwaukee Wauwatosa	W. Lloyd Street at N. 66th Street	Menomonee River, near N. 62nd Street	1.1
Underwood Creek, main stem	Brookfield Elm Grove Milwaukee New Berlin Wauwatosa West Allis	Border of Milwaukee and Waukesha Counties, north of W. Blue Mound Road	Menomonee River, near W. North Avenue and N. Menomonee River Parkway	2.6
Underwood Creek, South Branch	Brookfield Elm Grove Milwaukee New Berlin Wauwatosa West Allis	W. Greenfield Avenue, west of S. 116th Street	Underwood Creek, main stem, north of W. Blue Mound Road, west of Underwood Creek Parkway	1
Woods Creek	Milwaukee West Allis West Milwaukee	S. 56th Street, north of W. Walker Avenue	Menomonee River, near S. 44th Street	1.1

Chapter 13 Appendix
Table 4
Milwaukee River Tributaries

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Beaver Creek	Brown Deer Mequon Milwaukee	N. 64th Street, south of W. Brown Deer Road	Milwaukee River, east of N. Green Bay Road and N. Deerwood Drive, extended	1.9
Brown Deer Park Creek	Brown Deer Glendale Milwaukee River Hills	W. Good Hope Road, 0.5 mile west of N. Range Line Road	Milwaukee River, east of N. Range Line Road	1.9
Indian Creek	Bayside Fox Point Glendale River Hills	E. Dean Road and N. Indian Creek Parkway	Milwaukee River, south of W. Bradley Road	1.9
Lincoln Creek	Brown Deer Glendale Milwaukee	Railroad culvert east of N. 60th Street, north of W. Hemlock Street	Milwaukee River, near N. Green Bay Road and W. Lawn Avenue	8.1
Milwaukee River, main stem	Bayside Glendale Mequon Milwaukee River Hills Shorewood Thiensville Whitefish Bay	Border of Milwaukee and Ozaukee Counties, at W. County Line Road, east of N. Green Bay Road	Estuary, at former North Avenue Dam	12.9
Southbranch Creek	Brown Deer Milwaukee River Hills	W. Bradley Road and N. Edgeworth Drive	Milwaukee River, east of N. Green Bay Road and N. Teutonia Avenue	1.5

Chapter 13 Appendix
Table 5
Oak Creek and Tributaries

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Mitchell Field Ditch	Cudahy Milwaukee Oak Creek	S. Howell Avenue and E. Citation Way	Oak Creek, main stem, in Clement Avenue Park, east of the railroad tracks	3.3
Oak Creek, main stem	Cudahy Franklin Greenfield Milwaukee Oak Creek South Milwaukee	W. Southland Drive	S. Pennsylvania Avenue, north of Manitowoc Avenue	8.4
Oak Creek, North branch	Greenfield Milwaukee Oak Creek	Culvert under the most southerly crossing of the Airport Spur Freeway	Oak Creek, main stem, near W. Ryan Road, west of S. Howell Avenue	5.7

Chapter 13 Appendix
Table 6
Root River and Tributaries

Streams Under District Jurisdiction				
Watercourse	**Municipalities in Watershed**	**Upstream Terminus**	**Downstream Terminus**	**Length (miles) -approximate-**
Crayfish Creek, main steam	Oak Creek	E. Elm Road, 0.5 mile east of S. Nicholson Road	County Line Road, 0.5 mile east of S. Nicholson Road	0.5
Hale Creek	West Allis	W. Lincoln Avenue, West of State Highway 100	Root River, North Branch, near W. Montana Avenue	1.3
Lower Crayfish Creek, main stem	Oak Creek	S. 14th Street, extended, north of County Line Road	County Line Road, 0.5 mile east of S. Nicholson Road	0.4
Root River, 104th Street Branch	Greenfield Milwaukee	West of 99th Street, north of W. Cold Spring Road	Root River, North Branch, south of W. Cold Spring Road	0.5
Root River, East Branch	Franklin Greendale Greenfield Milwaukee Oak Creek	S. Melinda Street, south of W. Parnell Avenue	Root River, North Branch, west of S. 60th Street and W. Cascade Drive	5.2
Root River, North Branch	Franklin Greendale Greenfield Hales Corners Milwaukee Muskego New Berlin Oak Creek West Allis	S. Root River Parkway and W. Lincoln Avenue	S. 60th Street, south of W. Oakwood Road	13.2
Root River, West Branch	New Berlin West Allis	S. 124th Street, south of W. Cleveland Avenue	Root River, North Branch, South of W. National Avenue	1
Tess Corners Creek	Franklin Greendale Muskego New Berlin	0.5 mile southwest of W. Rawson Avenue and S. Lovers Lane	Root River, North Branch, near W. College Avenue and S. Root River Parkway	2.2
Whitnall Park Creek	Franklin Greenfield Hales Corners Muskego New Berlin	W. Edgerton Avenue and S. 113th Street	Tess Corners Creek, near S. 92nd Street and W. College Avenue	2.7