WELCOME TO THE SEPTEMBER EDITION OF THE 2016 M&R SEMINAR SERIES
BEFORE WE BEGIN

* SAFETY PRECAUTIONS
  ➢ PLEASE FOLLOW EXIT SIGN IN CASE OF EMERGENCY EVALUATION
  ➢ AUTOMATED EXTERNAL DEFIBRILLATOR (AED) LOCATED OUTSIDE

* PLEASE SILENCE CELL PHONES OR SMART PHONES

* QUESTION AND ANSWER SESSION WILL FOLLOW PRESENTATION

* PLEASE FILL EVALUATION FORM


* STREAM VIDEO WILL BE AVAILABLE ON MWRD WEBSITE (www.MWRD.org: Home Page ⇒ MWRDGC RSS Feeds)
Gregory Hottinger, P.E.

**Current:** Asset Management Program Director, for the Milwaukee Metropolitan Sewerage District (MMSD), Milwaukee, WI

**Experience:** Worked the last 11 years for the MMSD with positions in project management, construction management and for the last 4+ years as the Asset Management Program Director. Prior to joining the MMSD, worked for a light gauge steel manufacturer, several consulting firms and the MWRDGC. My early career focused on structural design in the power, industrial and wastewater industries.

**Education:** Bachelor of science in Civil Engineering from the University of Wisconsin – Milwaukee

**Professional:** Professional engineer registered in the State of Wisconsin Member of the American Society of Civil Engineers and Member of the Institute of Asset Management.
Asset Management at Milwaukee Metropolitan Sewerage District (MMSD)

Greg Hottinger, P.E. - MMSD
Asset Management Program Director
Asset Management

ISO 55000 Definition:

“coordinated activity of an organization to realize value from assets”
MMSD Planning Area

- 1.1 Million Population
- 411 Square Miles
- 28 Communities
- Possible Extension – Raymond & Caledonia
MMSD Asset Systems

- Water Reclamation Facilities
- Conveyance & Storage
- Administrative Facilities
- Green Infrastructure
- Watercourse & Flood Management
Water Reclamation Facilities & Biosolids Handling

- Jones Island & South Shore WRF
  - 575 MGD Daily Max Flow
- Interplant Solids Pipeline
  - 11 mile pipeline for biosolids transfer
- Milorganite Processing
  - 130 tons/day
Conveyance & Storage System

- Approx. 300 miles of interceptor sewer
  - 6% combined, 94% separate
  - 8 inch to 150 inch
- Inline Storage System ("Deep Tunnel")
  - 32 miles
  - 17 ft to 32 ft diameter
  - 521 MG storage
Flood management for approx. 129 miles of waterways

- Six watersheds
- 350 acres of land
Green Infrastructure

- 10 – 15 year easements
- 21.5 MG of rainfall capture capacity – Since 2002
- Goal – 740 MG
Administrative Facilities

- MMSD HQ & Lab
- WRF Administrative Buildings
- Other Admin. Buildings
  - 13th & College
  - 25th & Canal
  - KK & Milwaukee River Flushing Stations
Asset Management Driver

2002
- Stipulation w/WDNR requires CMOM Program

2005
- CMOM Gap Analysis completed

2007
- AM started as part of CMOM program
Early Years (2007-2012)

Conveyance
Focused

Limited Staff

Limited Scope
Conveyance Information

GIS System

Sewer Inspections
EXECUTIVE SUMMARY

The District-owned gravity overflow sewer at N 106th St & W Fischer Plwy (SS950/SS950) discharged an estimated 87,000 gallons of sewage (as reported to the DNR) into Underwood Creek on April 9th, 2007. The map in Figure 1 shows the layout of the system in this area. The sewage was spilled rather than allowing it to backup into local sewer systems.

The overflow was caused by precipitation-induced flows from the tributary sewersheds that are above the capacity of the 39th special section (SS) Underwood Creek Metropolitan interceptor Sewer (MIS). The Underwood Creek MIS is relieved by the Underwood Creek pump station during high flow conditions. An operating problem with the control system at the Underwood Creek pump station (PG3030) shut the station down for a short period of time during the peak flow of this event. The shut down caused excess flow to be sent to the 39th SS MIS. The excess flow caused the overflow to be sustained for a longer period of time than it otherwise would have been but it was not the primary cause of the overflow.

There is a project (CG3005, Underwood Creek MIS Relief Sewer) presently under way addressing the capacity in this part of the system. Modeling results showed that if this relief sewer had been constructed, the system would have conveyed this flow without allowing the levels to rise to the point that flow would split through the gravity overflow. Because this flow event is considered to be greater than a 5-year recurrence interval, no further construction work is recommended.

One of the tributary sewersheds is listed in the 22G0 Facilities Plan as being slightly above (by 1%) the District’s Chapter 3 peak flow performance standard. The Wet Weather Peak Flow Management Program is currently (as of 3/25/08) working with Wauwatosa to determine the best place to locate a...
Early Challenges

- Staff understanding
- Connection to organization’s goals
- Authority to make changes
- Clear tasks, timelines, resources
2013 - Re-evaluate Program
WERF SAM-GAP Analysis

**Tool**
- Comparison to water/wastewater AM best practices
- 150 questions – 7 core elements

**MMSD Process**
- Interviewed 35 people (Cross Divisional)
- Summarized results – one analysis
# SAM-GAP Results

<table>
<thead>
<tr>
<th>Quality Elements</th>
<th>Weighted Gap</th>
<th>Rank</th>
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</thead>
<tbody>
<tr>
<td>AM Plans (AMP)</td>
<td>44</td>
<td>1</td>
</tr>
<tr>
<td>People Issues (People)</td>
<td>29</td>
<td>2</td>
</tr>
<tr>
<td>Organizational Issues (Org)</td>
<td>19</td>
<td>3</td>
</tr>
<tr>
<td>Information Systems (Info Sys)</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Data and Knowledge (D&amp;K)</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>Process and Practices (P&amp;P)</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Service Delivery (Service Del)</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>
GAP Analysis - Action Items

- Implementation Strategy
- Program Structure/Steering Committee
- Commission Policy
- Asset Management Plans (AMP’s) – Facilities Plan
Implementation Strategy

Task List

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

<table>
<thead>
<tr>
<th>SMART GOALS</th>
<th>Target Date</th>
<th>Gaps Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>April 2014</td>
<td>5.01 - Organizational Issues</td>
</tr>
<tr>
<td>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.</td>
<td>April 2014</td>
<td>5.01 - Organizational Issues</td>
</tr>
<tr>
<td>Define and document asset management roles and responsibilities for staff in all District departments. In addition, define AM responsibilities of stakeholders, designers and contractors.</td>
<td>April 2014</td>
<td>5.01 - Organizational Issues</td>
</tr>
<tr>
<td>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 needed updates.</td>
<td>September 2014</td>
<td>5.01 - Organizational Issues</td>
</tr>
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</table>

Staffing Forecast

- Program Director
- Analyst
- Database Coordinator

<table>
<thead>
<tr>
<th>Year</th>
<th>Program Director</th>
<th>Analyst</th>
<th>Database Coordinator</th>
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<tbody>
<tr>
<td>2014</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2015</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2016</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2017</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>
Program Structure

Strategic

Tactical
AM Teams– KPI’s/AM Strategy/AMP’s

Operational
Business Units – PI’s/SOP’s
Steering Committee - Duties

- Program guidance
- Review and approve high-level documents
- Approve AM staffing recommendations
- Quarterly meetings
Asset Management can be defined as a management strategy developed to achieve the following objectives:

- Utilize assets to provide defined levels of service
- Maintain a level of risk acceptable to the organization
- Achieve service level and risk objectives at the lowest life cycle cost
Asset Management Plans (AMPs)

Answer the following questions:

- What is my required level of service?
- What is the current state of my assets?
- Which assets are critical to sustained performance?
- What are my best operations, maintenance and capital improvement program investment strategies?
Facilities Plan - Asset Management Basis

1. Levels of Service (LOS)
2. Future Demand
3. Assessment of Existing Facilities
4. Business Risk Assessment
5. Risk Management Strategies
6. Optimized Plan
7. Financial Summary
8. Plan Improvement and Monitoring
Level of Service Categories

Environmental
- Permit/Legal
- Energy
- Environmental Improvements

Social
- Customer Service
- Safety

Economic
- Financial
- Management Effectiveness
Level of Service - Metrics

**Environmental**
- Permit/Legal – SSO events/year
- Energy - % of energy from renewable sources
- Environmental Improvements – Total GI capacity installed (MG)

**Social**
- Customer Service – Odor complaints/year
- Safety – # of buildings in 1% probability floodplain

**Economic**
- Financial – Annual tax levy increase
- Management Effectiveness – AMP’s updated annually
Assess Facilities

- Capacity
- Performance
- Condition
- Cost

Risks
RISK = LIKELIHOOD OF FAILURE X CONSEQUENCE OF FAILURE

Risk Based

Consequence

Likelihood

Very Low  Very High

Very High  Very Low

High  Moderate  Low  Minimal
Focus on highest risks
Perform Business Case Evaluation (BCE)
Alternatives include:
- Rehabilitation
- Replacement
- Operational Change
- Revised Maintenance
- Program/Policy
Prioritize Investments
Capital Budget Forecast

2015-2021: Capital Improvement Program Expenditures and Disbursements

- **Total Expenditures (in millions)**
  - $0
  - $50
  - $100
  - $150
  - $200
  - $250

- **Yearly Breakdown**
  - **2015**
    - Estimate
    - Tax levy increase 2.85%
  - **2016**
    - Budget
    - Tax levy increase 2.50%
  - **2017**
  - **2018**
  - **2019**
  - **2020**
  - **2021**

- **Forecast**
  - Tax levy increase 4%

- **Expenditure Categories**
  - Water reclamation
  - Conveyance
  - Watercourse & Flood Mgmt
  - Other projects
  - Debt

35
Long Range Rehab/Replace Costs

Conveyance Pipe Replacement Forecast

Estimated Rehab/Replace Year

Cost

200,000,000
150,000,000
100,000,000
50,000,000
0
2009 2013 2019 2021 2023 2025 2029 2031 2033 2035 2039 2041 2043 2045 2049 2051 2053 2055
Integrated Water Management – Long Term Thinking

Green Infrastructure

I/I Reduction (PPII)

Stormwater / Flood Management

Conveyance

ISS/WRF

LAKE MICHIGAN WATER SYSTEM
What mix of management strategies is most cost effective at reducing risk and meeting LOS goals?
Information - how can staff access & use it?

Web-based asset database
AMP - SUBSYSTEM DASHBOARD

Asset Management Plan - Conveyance

SUBSYSTEM 1 - 2015

1. SUBSYSTEM DESCRIPTION

Rural/Municipal Services by Subsystem

Subsystem 1 conveys water to the municipalities of West Allis, West Milwaukee, City of Milwaukee, Greenfield, St. Francis, Cudahy and Oak Creek.

Description of usage

Subsystem 1 is comprised of the following sewer legs:

- Leg 40
- Leg 41
- Leg 42
- Leg 43

Unique Systems

- Drainage 41
- Roadway 42
- OSS Outlets 43
- Sidewalk 44
- Storm Sewers 45

2. PERFORMANCE

Condition of Subsystem

The area of subsystem 1 approximately 10,490 acres, about 7 percent of the total planning area.

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Current</th>
<th>New Asset</th>
<th>Analysis and Evaluation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsystem 1</td>
<td>10,490</td>
<td>7%</td>
<td>5%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Maintenance Excellence

The maintenance excellence of the proposed maintenance program was assessed based on the quality of workmanship, the effectiveness of the maintenance program, and the ability to maintain the system in good working order.

3. OPERATIONS AND MAINTENANCE

The overall annual sewer area dashboard contains information on the following topics:

- Cost of Operations Maintenance
- Service Level Evaluation and Assessment
- Benefits and Cost Analysis of Alternative Strategies

The information was generated from the 2015 Annual Report on Collection System Operations.

4. RISKS

Table:

<table>
<thead>
<tr>
<th>Risk ID</th>
<th>Risk Title</th>
<th>Likelihood</th>
<th>Risk Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C120</td>
<td>Risk 1 - Risk 1</td>
<td>Medium</td>
<td>Risk of system failure due to aging infrastructure.</td>
</tr>
<tr>
<td>C160</td>
<td>Risk 2 - Risk 2</td>
<td>High</td>
<td>Risk of system failure due to excessive load.</td>
</tr>
<tr>
<td>C200</td>
<td>Risk 3 - Risk 3</td>
<td>Low</td>
<td>Risk of system failure due to insufficient capacity.</td>
</tr>
</tbody>
</table>

5. ACTIVE/COMPLETED PROJECTS

Table:

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Project Title</th>
<th>Project Status</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Project 1</td>
<td>Complete</td>
<td>Description of Project 1.</td>
</tr>
<tr>
<td>P2</td>
<td>Project 2</td>
<td>In Progress</td>
<td>Description of Project 2.</td>
</tr>
</tbody>
</table>

Note: The project status and description are placeholders for actual project information.
Conveyance – Interactive Mapping
WRF’s – Lidar Scans, Building Information Modeling (BIM)
Benefits of AM

- Improved communication
- Access to information – break-down silos
- Risk based decision making tied to org. goals
- Improved information to support financial planning
- Consistent, repeatable process developed for continuous improvement
- Line of sight – staff knowledge promotes ownership
Lessons Learned

- Take approach of how can I help you – build bridges
- Cultural change takes time
- Never too soon to get started - It will never be perfect
- Data clean-up is labor intensive
QUESTIONS?