Asset Management - Bloomington Case Study

Wednesday, January 27, 2016
• **Bloomington and AM**
  *Bringing AM to the City*

• **What is the Bloomington's AM Approach?**

• **Bloomington’s AMP System**

• **How Did Bloomington Accomplish AMP?**
BLOOMINGTON AND ASSET MANAGEMENT

Bringing AM to the City
Bloomington Facts

- Population 86,000
- 14 MGD Water Treatment Facility
- 6 Deep Wells, range 380 – 960’
- 410 miles of water mains
- 3,300 City hydrants, 1,320 private hydrants
- 350 miles of sewer mains
- 6,700 City manholes, 1,850 private
- 28 sanitary lift stations, 6 storm lift stations
- 24,000+ metered connections
- Home to Mall of America, Toro, Seagate Technologies, other manufacturing & major hotel hub
- Award-winning Water “Best in Glass” MN 2015!
**Project Timeline**


- **1998** City implemented an enterprise-wide GIS (SmallWorld).

- **2006** Utilities Division upgraded to the Enterprise Asset Management (Infor EAM) system.

- **2014** EAM system was updated and enhanced and the GIS system was replaced with ESRI.

- **2015** EAM, Reliability and the GIS systems were integrated.
  - Integration included: configuring and integrating equipment assets, labor and parts/materials.
  - The assets included thousands of hydrants, water mainlines, water service lines, sewer mainlines, valves, lift station equipment, etc.
What is the City of Bloomington's Asset Management Approach?
Bloomington’s AM Mission and Vision...

“Bloomington’s Utilities Asset Management Program, in cooperation with our service partners, will maximize the life while minimizing the costs and risk exposure related to our critical assets. This ongoing program highlights Bloomington's commitment to sustainable, high quality services at an affordable price.”
Questions asked:
• How long will it last?
• How often does it fail?
• Does it meet service levels?
• Condition of infrastructure?
• Material?
BLOOMINGTON'S SYSTEM DATA FEEDS
AM PROGRAM – EARTH SHATTERING

Enterprise Asset Management

Collect Data
Assemble Into Information
Share For Decision-Making

Applications
CIS Models
SCADA FIS
GIS CMMS

infor
tyler technologies
esri
HARRIS UTILITIES
Bentley
GOODPOINTE TECHNOLOGY

DAILY NEWS
BREAKING NEWS!!

Dashboard LIVE

Applications
CIS Models
SCADA FIS GIS CMMS
BLOOMINGTON’S AMP System
1. Bloomington utilizes Infor EMA as a powerful and integrated tool.
2. EAM manages assets and work orders.
3. Multiple sources feed into the overall AMP.
Work Orders – Records Labor, Equip, Work, Problems

Work Order 521464 assist plumber w/blockage in service MH

Search within All WO's

Linear Reference

Activity

Problem

Trade

Task

Material List

Estimated Hours: 0.25

Hours Remaining: 0.25

People Required: 1

Work Orders – PM and Work History
DASHBOARD – RELIABILITY AM

Inbox
Folder: Operations

Chart data is missing.

Chart Controls
Organization: WIS
Chart Type: 
Chart Period: Months
Show Year/Year: 

KPIs

Reliability Sanitary Mainline, 7,794
Reliability Hydrants
Reliability Sanitary Lift Stations
Reliability Sanitary Services, 1
Reliability Water Services, 2
### Closing Codes

The screenshot shows a software interface with various data entries and questions related to an asset management system. The interface includes fields for questions, answers, descriptions, and values. The system appears to be used for surveying and managing asset data.

#### Question 1
What is the impact to property safety?
- **Answer:** PP11
- **Description:**...

#### Question 2
What is the impact to the environment?
- **Answer:** E22
- **Description:**...

#### Question 3
What is the impact to product quality?
- **Answer:** P7
- **Description:**...

#### Question 4
What is the impact to capacity?
- **Answer:** C7
- **Description:**...

The interface also includes options for searching within the asset management system and editing various parameters. The system seems to be used for tracking and assessing the impact of different factors on assets.
### Equipment Within Search Area

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
<th>Organization</th>
<th>Department</th>
<th>Class</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>09-CH-026</td>
<td>09440-3101 W 8137 ST</td>
<td>WIS</td>
<td>WATER</td>
<td>HYDRANT</td>
<td>Installed</td>
</tr>
<tr>
<td>09-CH-037</td>
<td>09380-8030 VINCENT AVE S</td>
<td>WIS</td>
<td>WATER</td>
<td>HYDRANT</td>
<td>Installed</td>
</tr>
<tr>
<td>09-PH-036</td>
<td>09440-9111 XERES CIR</td>
<td>WIS</td>
<td>WATER</td>
<td>HYDRANT</td>
<td>Installed</td>
</tr>
</tbody>
</table>

- **Common GIS Tools**
- **Search with Dataspy and Filter**
- **Search by Layer**
- **Search by Geocode**
- **Search by Linear reference**

**Graphically located Equipment integrated on map.**
GIS Created Work Orders

[Image of GIS Map Search interface with search criteria and options for Work Orders within search area]
Panasonic Toughbooks, Tablets, Smartphones

- VPN solution for secure connectivity
- Designed for field workers who need wireless networks and mobile devices
How Did Bloomington Accomplish Amp?
DATA CLEANUP, DATA STRUCTURE AND ...
AND...

- Support from Administration
  Hours and hours and hours of data planning, configuring, scrubbing, and integrating
  - Team of Bloomington!
- Assistance from consultants
- $90,000 initial cost
- New infrastructure management practices
- Data review (and...)
## Data Review and Evaluation

<table>
<thead>
<tr>
<th>Condition Data</th>
<th>% Available</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leak detection to support PMP? (not in GIS or DS, used to support CIP decision)</td>
<td>low</td>
<td>Cookie analysis program? Explore options for high priority pipes</td>
</tr>
<tr>
<td>Contractor inspection – data in project files – deterioration over time</td>
<td>100%</td>
<td>Confirm they are providing remaining life estimates. Look at pulling condition data into DS?</td>
</tr>
<tr>
<td>Component focused PM program, no major inspection</td>
<td>75%</td>
<td>Review PM program depth, verify how data is recorded (low priority)</td>
</tr>
<tr>
<td>Datastream</td>
<td>100%</td>
<td>Apply to ranking system</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Performance</th>
<th>% Available</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haestad methods</td>
<td>100%</td>
<td>Integrate with AM rating system</td>
</tr>
<tr>
<td>SCADA system - trending</td>
<td>100%</td>
<td>None</td>
</tr>
<tr>
<td>Pump performance tracked in SCADA (operation cycles, pump output, run times)</td>
<td>100%</td>
<td>How to fit into performance model (low priority)</td>
</tr>
<tr>
<td>Track hydrant flowtest and static pressure in GIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driven by requests (202 historic flow tests)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible expansion of flow and pressure testing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2009 EMA, Inc
PROGRAMS - COLLECT AND CAPTURE CONDITION

- CCTV Sanitary and Storm Pipe Inspection
- PM Program to Inspect Plant Processes
- Tank and Reservoir Inspection
- Hydrant Inspection Program
- Water Pipe “Cookie” Inspection
**Determined and Defined Consequence of Failure**

<table>
<thead>
<tr>
<th>Safety</th>
<th>Environmental</th>
<th>Operational</th>
<th>Hidden Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 = Multiple fatality</td>
<td>40 = Potential for severe environmental damage (see attached)</td>
<td>10 = Does not meet ODEQ objectives for effluent quality 10 = Does not meet nutrient limits</td>
<td>10 = Above expected energy and chemical costs per MLD treated 20 = The system has protection that, upon failure, can result in potential for a disabling injury, fatality, severe environmental damage or operating costs exceeding $5 Million</td>
</tr>
<tr>
<td>38 = Fatality</td>
<td>32 = Potential for major environmental damage (see attached)</td>
<td>8 = Unable to meet ODEQ objectives for effluent quality</td>
<td>8 = Localized public complaints. Community groups &amp; committees 15 = The system has protection that, upon failure, can result in the potential for a lost time injury, major environmental damage or operating costs exceeding $1 Million.</td>
</tr>
<tr>
<td>34 = Results in disabling injury (critical injury)</td>
<td>28 = Potential for significant environmental damage (see attached)</td>
<td>6 = Between C of A objectives for effluent quality and compliance limits</td>
<td>6 = Failure results in higher operating costs including parts and excessive OT, external services 10 = The system has protection that, upon failure, can result in the potential for minor injury, significant environmental damage or operating costs exceeding $500,000</td>
</tr>
</tbody>
</table>

**Process Failure Consequence Evaluation**

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**Calculated Risk Factors = Probability of Failure x Consequence of Failure**
End-Results Provide the Ability to...

- Utilize analytical tools to observe, monitor and predict the remaining lifecycle of each asset.

  *** Multiple tools (software systems) are needed for AMP.

- Analyze historic condition, performance and reliability asset information for CIP budgetary decision-making.

- Provide an easy-to-use system to manage work, materials and equipment.

- Incorporate integrated data from the work orders to AMP.

- Eliminate redundant data entry.

- Provide reports, maps…
REPORTS - RELIABILITY DATA

WORK HISTORY TO IDENTIFY MAIN BREAKS AND COST PER BREAK

[Bar chart showing maintenance cost ($/Year) vs. street names]
REPORTS - MAPS

CCTV Work History to Identify Tree-Sized and Jetted Areas
## TOP 25 WATER USERS IN 2015

<table>
<thead>
<tr>
<th>GALLONS PER YEAR</th>
<th>CUSTOMER</th>
<th>LAND USE</th>
<th>WATER USED (GALLONS PER YEAR)</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>104,163,891</td>
<td>MALL OF AMERICA</td>
<td>MOA</td>
<td>50000000</td>
<td>-14%</td>
</tr>
<tr>
<td>41,076,000</td>
<td>CYPRESS SEMICONDUCTOR</td>
<td>I</td>
<td>50000000</td>
<td>-1%</td>
</tr>
<tr>
<td>38,425,675</td>
<td>SEAGATE TECHNOLOGIES 76350</td>
<td>H</td>
<td>50000000</td>
<td>2%</td>
</tr>
<tr>
<td>34,271,612</td>
<td>DOUBLETREE-PART OF</td>
<td>I</td>
<td>50000000</td>
<td>2%</td>
</tr>
<tr>
<td>32,329,903</td>
<td>RADISON &amp; WATER PARK</td>
<td>H</td>
<td>50000000</td>
<td>3%</td>
</tr>
<tr>
<td>31,780,343</td>
<td>SEAGATE TECHNOLOGIES 4675</td>
<td>I</td>
<td>50000000</td>
<td>3%</td>
</tr>
<tr>
<td>24,691,357</td>
<td>RAMADA INN</td>
<td>I</td>
<td>50000000</td>
<td>4%</td>
</tr>
<tr>
<td>21,032,506</td>
<td>GEORGETOWN APARTMENTS</td>
<td>APT</td>
<td>50000000</td>
<td>4%</td>
</tr>
<tr>
<td>20,292,095</td>
<td>MARRIOTT AIRPORT-PT OF</td>
<td>H</td>
<td>50000000</td>
<td>5%</td>
</tr>
<tr>
<td>17,690,406</td>
<td>CYPRESS SEMICONDUCTOR</td>
<td>I</td>
<td>50000000</td>
<td>6%</td>
</tr>
<tr>
<td>17,586,402</td>
<td>DONALDSON COMPANY</td>
<td>I</td>
<td>50000000</td>
<td>7%</td>
</tr>
<tr>
<td>16,695,534</td>
<td>SEAGATE TECHNOLOGIES 7801</td>
<td>H</td>
<td>50000000</td>
<td>7%</td>
</tr>
<tr>
<td>16,113,513</td>
<td>POLAR FAB</td>
<td>I</td>
<td>50000000</td>
<td>7%</td>
</tr>
<tr>
<td>15,842,245</td>
<td>EMBASSY SUITES AIRPORT</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>15,690,567</td>
<td>CROWNIE PLAZA-PART OF</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>13,255,000</td>
<td>AIRPORT HILTON</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>12,546,094</td>
<td>COMFORT INN/OUTBACK STKHS</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>12,491,000</td>
<td>VILLAGE PARK APTS</td>
<td>APT</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>12,123,058</td>
<td>AVALON AT DEVONSHIRE</td>
<td>APT</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>12,105,869</td>
<td>BLOOMINGTN CNTRL STA BOILER BLDG</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>11,794,396</td>
<td>INTERNATIONAL VILLAGE</td>
<td>APT</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>11,735,395</td>
<td>HAMPSHIRE HILLS APTS</td>
<td>APT</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>11,159,812</td>
<td>EMERALD PARK APARTMENTS</td>
<td>APT</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>11,103,131</td>
<td>HOLIDAY INN EXPRESS</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
<tr>
<td>10,791,914</td>
<td>HAMPTON INN/SPRINSHILL</td>
<td>H</td>
<td>50000000</td>
<td>8%</td>
</tr>
</tbody>
</table>

### BLOOMINGTON WATER CONSUMPTION BY LAND USE

- **MALL OF AMERICA + ANCHORS (MOA)**: 111,821,099 gallons, -13%
- **HOTELS/MOTELS (H)**: 346,318,969 gallons, -7%
- **TECHNOLOGY AND INDUSTRY (I)**: 208,988,783 gallons, 2%
- **APARTMENTS (APT)**: 324,095,113 gallons, -3%
- **RESIDENTIAL AND OTHER COMMERCIAL (RES)**: 2,781,573,334 gallons, 7%
- **UNACCOUNTED FOR (U)**: 327,467,450 gallons

**TOTAL FOR CITY**: 3,772,799,298 gallons, -4%

### BLOOMINGTON WATER SUPPLY

- **BLOOMINGTON WTP**: 2,991,266,298 gallons, 79%
- **MINNEAPOLIS**: 781,533,000 gallons, 21%

**TOTAL FOR CITY**: 3,772,799,298 gallons, -4%
QUESTIONS FOR THE PANEL?