Using GIS to Track and Prioritize Your Assets

Brian Vilmont, P.E.
Prein&Newhof
616-250-2468
What is GIS?

- **Geographic Information System**

- **Geographic** – Location of an asset
- **Information** – Characteristics of an asset
- **System** – Software that allows connection between the mapping and the information.

- GIS = Map + Spreadsheet + Software
ESRI ArcGIS is foundational software

Leading standard for infrastructure management in the U.S.

Starting use was primarily for planning
Specialized Management Tools

- **Roadsoft**
- **Cartegraph**
- **Innovyze**
- **Cityworks**
- **PubWorks**

Computerized Maintenance Management System (CMMS) for operations and maintenance

Software usually works in conjunction with ESRI geodatabase

Maintenance and rehabilitation work orders, condition inspection schedules, monitoring programs
Asset Management

GIS is the backbone used to develop applications for improving operations and data mining.

CMMS applications are used to schedule, track and archive all activities and costs.

CMMS should interface with the GIS and would ensure the GIS is used on a daily basis as part of your business process.
Geographic Information Systems (GIS)

Know where things are and information about them.

Record your documents and make them accessible.
• Paper files, drawings, spreadsheets, reports, manuals, etc.

How can GIS help?
• Greater efficiency, reaction time and confidence
• More effective collaboration
• Assist in documenting regulatory compliance
• Better customer service
  • Are you being reactive or preventive?

Start simple - Get organized – Use right away – Use daily
Infrastructure Assets

What do infrastructure and opossums have in common?

They both get no respect.
Design Life Cycles

60% CONDITION 75% LIFE

$1.00 FOR REHABILITATION HERE

WILL COST $4.00 TO $5.00 HERE

SIGNIFICANT DROP IN CONDITION

SMALL % OF PAVEMENT LIFE
Step 1 of Infrastructure Management

- Inventory your Assets
  - Identify assets
  - Mapping
  - Condition assessment
Identify Assets

- Sewer system
  - Collection and treatment
- Water system
  - Supply and distribution
- Streets
- Storm sewers
- Sidewalks/pathways
- Buildings
- Parks/facilities
Create a Map of Assets

- Utilize geographic information system (GIS) to create asset maps
- Identification of individual asset segments
  - Roads – block by block
  - Sewers – segments between manholes
  - Water mains – segments by block
Asset Maps - Roads

- Surface Condition
- Structural Integrity
- Curbs
- Sidewalks
- Drive Approaches
Asset Maps - Water Main

- Age
- Materials
  - Asbestos cement
  - Cast iron
  - Ductile iron
  - PVC
  - HDPE
- Break history
- Capacity (reliability)
- Fire flows
Asset Maps - Sanitary Sewer

- Infiltration and Inflow Study
- Capacity Analysis
- Sanitary Sewer Evaluation Study
  - Manhole Inspections
  - Television Inspection
  - Smoke Testing
  - Dye Testing
Asset Maps – Storm Sewer

- Infiltration and Inflow Study
- Capacity Analysis
- Storm Sewer Evaluation Study
  - Manhole Inspections
  - Television Inspection
  - Smoke Testing
  - Dye Testing
- Green Infrastructure
Facilities

- **Water System**
  - Surface Water Intakes and Wells
  - Metering and Chemical Feed Stations
  - Treatment Plants
  - Booster Pumping Stations
  - Ground and Elevated Storage Tanks

- **Storm and Sanitary System**
  - Pumping and Metering Stations
  - Storage and Equalization Systems
  - Treatment Plants
  - Surface Water and Groundwater Discharge Systems
Condition Assessment

- Initial assessment can be as straightforward as excellent, good, fair, marginal, and poor
- More detailed assessments can be added later
Infrastructure Catastrophes Happen
Infrastructure Catastrophes Happen
Infrastructure Catastrophes Happen
Infrastructure Catastrophes Happen
Identify Problem Areas

Composite Deficiencies

• Overlapping Issues
• Project Coordination
• Combined Projects
• GIS (geographic information system)
Prioritize Known Problem Areas

- Water system
  - Low-pressure areas
  - Fire flow issues
  - Frequent breaks
  - Water quality issues
Identify Projects

• Identify Critical Factors
• Identify Project Extents
• Probable Costs
Capital Improvement Plan

- Funding Opportunities
- Multi-Year Planning
- Predictable Expenditures
Why GIS?

- GIS condition ratings are edited as assets either decline or are improved
- Provides storage of institutional knowledge
- Allows mapping of sorted data
- Asset layers can be overlaid to identify multiple problem areas
- GIS viewers can be used by any staff
- Maps provide a communication tool with elected officials and the public
Addition GIS applications

• Record Drawings
• Staff Knowledge
• Operational Information
• Maintenance Records
• Data access in the field
As-built drawings can be scanned to PDF files then linked to the GIS. Finding record drawings is as simple as point and click.
Handwritten notes layers

Capture knowledge of field crew or transitioning personnel.
Maps for water operations
Maps for water repairs

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBJECTID</td>
<td>3</td>
</tr>
<tr>
<td>SHAPE</td>
<td>Point</td>
</tr>
<tr>
<td>Date</td>
<td>9/12/2013</td>
</tr>
<tr>
<td>Description</td>
<td>Installed 88.25&quot; of DI pipe and 2-Hymax Couplers</td>
</tr>
</tbody>
</table>
Mobile Apps- From the office to the field

Different levels for viewing, collecting or editing information.

• ArcGIS Apps for Smartphones and Tablets
• ArcGIS for Windows Mobile
• ArcPad for handheld GPS
Reactive or Proactive
How do you want to manage your assets?
THANK YOU!

Contact for Information or Questions

Brian Vilmont, P.E.
Prein&Newhof
616-250-2468