The New Age for GIS Sewer Planning at the City of Los Angeles

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Parties Involved

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Outline

1. Background
2. Data Sources and Collection
3. Selection of InfoMaster
4. Software Utilization
5. Moving Forward
Background
City of LA Wastewater System

- Huge and complex
- Serves over 4M people
- Service area > 600 sq mi
- 29 satellite communities
- 6,700 miles of pipe
- 6-in to 150-in diameter
City of LA Wastewater System

- 90% (6,030 miles) are secondary sewers (≤15-in dia)
- 10% (670 miles) are primary sewers (≥16-in dia)
- 86% VCP, 10% Concrete
- 56% > 50 years old
- 4% (260 mi) > 100 years old
City of LA Wastewater System

- 25 Primary Sewer Basins
- 240 Secondary Sewer Basins
- 47 wastewater pumping plants
- 4 wastewater treatment plants
- 450 MGD average daily flow
Advanced Sewer Planning

• Extensive advance planning program
• Planned and renewed thousands of miles of sewers over the years
• Planning for Primary and Secondary Sewers
• Sewer Planning Optimization Tool (SPOT) in 2007
• SPOT successfully used to prepare the 100 highest priority secondary sewer basin plans for CSSA
• Customized solution posed maintenance challenges
• Need for Commercial-Off-The-Shelf (COTS) tool
Data Sources and Collection
Data Sources and Collection

- Massive amount of data to be collected, organized and analyzed
  - 18 unique data sources
  - Pipe and MH inventory data
  - CCTV inspection videos and logs
  - Parallel emergency sewer repair
  - Maintenance data (SSOs, root control, cleaning, etc.)

- Data scattered through several servers maintained by various Divisions and Bureaus
Selection Of InfoMaster
Selection Of InfoMaster

- InfoMaster provides same basic functionalities as SPOT
  - Data viewing
  - Planning decision algorithm
  - CCTV data viewer
  - Data management
  - Planning report support
- Provides additional functionalities for enhanced planning
  - Risk Score: Likelihoods and Consequences of asset failures
- Supported by commercial vendor who provides maintenance and upgrade at nominal cost
- Minimal customization for City of LA use
Software Utilization
InfoMaster Overview
A living, breathing, proactive asset integrity management and capital planning tool

1. Store information about your assets
   - Designed for Water and Sewer Utilities
   - Access to different types of information

2. Defensible & repeatable capital planning analysis
   - Risk-based prioritization & budgeting
   - Customizable decision tree for Capital Plans

3. 100% GIS Integrated
   - Leverages existing data
   - Seamlessly links CCTV data
   - Built-in data validation and clean-up tools

4. Rich results and reporting
   - Fully configurable
   - Share html/pdf reports
   - Share analysis results through AGOL
InfoMaster Workflow

Field Data Formats

Facility Info from Field

Work Order Management

Budget Rehab Plan

Sewer Only

REHAB PLAN (DRAFT)

Assign a Rehabilitation Method to each Defect

Detailed Plan for CCTV’d Pipes

Risk Analysis

Define CoF and LoF for each asset in the network and run a Risk Analysis

Prioritized List of Pipes to CCTV

Decision Tree

Fully customizable runs for each pipe is the system

Defensible and Repeatable Capital Planning
Software Utilization

• Provides centralized data platform for collecting, storing & disseminating data
• Pulls data automatically from three existing live servers
• Built-in & customized comparison/validation rules provide increased levels of data confidence:
  – invert elevation discrepancies
  – unusual pipe slopes
  – disconnected nodes
  – diameter discrepancies
  – crossing pipes
  – unusual manhole depths
  – invalid IDs
CCTV Analysis

- Automatically import videos, geocode defects, and track the history of the assets in terms of inspections
- View CCTV video & navigate to specific defects
Risk Analysis

- Applicable to assets with & without CCTV data
- Uses configurable algorithms to identify the Risk score of an asset based on Likelihood of Failure (LoF) and Consequence of Failure (CoF)

<table>
<thead>
<tr>
<th>Risk Class</th>
<th>Capital Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>High Priority in CIP / Yearly Operational Frequency</td>
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<tr>
<td>High</td>
<td>Standard Priority in CIP / Biannual Operational Frequency</td>
</tr>
<tr>
<td>Medium</td>
<td>Low Priority in CIP / 1 in 5 Years Operational Frequency</td>
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<tr>
<td>Low</td>
<td>1 in 10 Years Operational Frequency</td>
</tr>
<tr>
<td>Negligible</td>
<td>Wait for a problem to arise</td>
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</table>
Rehabilitation Planning

Multi-step decision algorithm to determine recommendations for pipe and structure repairs

- Employ ANY Logic
- Utilize ANY Data
- Defensible
- Repeatable
- Fast
Custom Reporting

• Configurable graphical & tabular reporting and summarization based on existing reporting was critical

• LASAN able to configure tables of their entire system or by sewer basin
  – Summations of pipe length by age, material, soil type...
  – Pie charts
  – 2D and/or 3D graphs of maintenance history
Share Results via ArcGIS Online

Latest InfoMaster results auto updated to ArcGIS Online

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## Sample Set of InfoMaster Users

<table>
<thead>
<tr>
<th>American Water</th>
<th>Durham, Region of, ON</th>
<th>Pittsfield, MA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anniston, AL</td>
<td>East Bay MUD, CA</td>
<td>Reading, MA</td>
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<tr>
<td>Baltimore, MD</td>
<td>Genessee Co., MI</td>
<td>San Antonio, TX</td>
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<td>Cambridge, MA</td>
<td>Honolulu, HI</td>
<td>San Jose, CA</td>
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<td>Charlotte, NC</td>
<td>Jacksonville, FL</td>
<td>Santa Ana, CA</td>
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<td>Cincinnati MSD, OH</td>
<td>London, ON</td>
<td>South Placer WD, CA</td>
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<td>Clayton County, GA</td>
<td>Los Angeles, CA</td>
<td>Scottsdale, AZ</td>
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<td>Mesa, AZ</td>
<td>Suburban Water, CA</td>
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<td>Columbia, MO</td>
<td>North Charleston, SC</td>
<td>Sweetwater, CA</td>
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<td>Dayton, OH</td>
<td>North Davis, UT</td>
<td>Tacoma, WA</td>
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<tr>
<td>DeKalb County, GA</td>
<td>Oakland, CA</td>
<td>Tampa, FL</td>
</tr>
<tr>
<td>Denton, TX</td>
<td>Otay WD, CA</td>
<td>United Water</td>
</tr>
</tbody>
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Moving Forward
Next Steps

- LASAN to incorporate new data sets & results
- Significant time savings: manage and analyze the remaining 140 secondary sewer basins (began top 100 in 2007 with previous program)
- Produce full sewer basin reports utilizing the built-in custom reporting tools
  - auto-generate comprehensive CIP reports unique to their needs
- Full risk assessment capabilities
- Regression analysis
- Asset deterioration modeling
Thank You For Joining Us!

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