GIS Based Asset Management

Managing public works investments to maintain and enhance our modern society
What is a Public Works Asset?

- It is our public built environment
- Things such as:
  - Roads
  - Stormwater
  - Bridges
  - Sidewalks and ramps
  - Water systems
  - Sewer systems
  - Storm drain
  - Lighting
“Asset Management involves the balancing of costs, opportunities and risks against the desired performance of assets to achieve the organizational objectives.”

– The Institute of Asset Management
Why it Matters

Public works infrastructure (Assets) are the framework of our modern society.

The public works infrastructure allows our families and business to focus on our goals.

We expect the capability to travel, have fresh water, flush the toilet, and be safe.
* Capital investment needs for the nation’s wastewater and stormwater systems are estimated to total $298 billion over the next twenty years.

* Fixing and expanding the pipes will address sanitary sewer overflows, combined sewer overflows, and other pipe-related issues.

* Since 2007, the federal government has required cities to invest more than $15 billion in new pipes, plants, and equipment to eliminate combined sewer overflows.

http://www.infrastructurereportcard.org/wastewater/
Estimated Condition of Sewer Pipes In 1980

- Failure: 5
- Poor/Very Poor: 3
- Fair: 19
- Good: 69
- Excellent: 5

EPA Gap Analysis
Estimated Condition of Sewer Pipes In 2000

- **Failure**: 7
- **Poor/Very Poor**: 16
- **Fair**: 18
- **Good**: 17
- **Excellent**: 43

EPA Gap Analysis
Estimated Condition of Sewer Pipes In 2020

EPA Gap Analysis
We have a Problem

Estimated Condition of Sewer Pipes In 1980
- Failure: 5
- Poor/Very Poor: 3
- Fair: 0
- Good: 0
- Excellent: 69

Estimated Condition of Sewer Pipes In 2000
- Failure: 7
- Poor/Very Poor: 16
- Fair: 18
- Good: 17

Estimated Condition of Sewer Pipes In 2020
- Failure: 9
- Poor/Very Poor: 33
- Fair: 33
- Good: 12
- Excellent: 11

Condition
We have work to do!
Asset Management Strategies

Risk = Probability of Failure \times Impact

- Run to Failure
- Preventative / Planned on Time
- Preventative / Planned on Usage
- Condition-based Maintenance
- Predictive Maintenance
- Reliability-centered Maintenance
Asset Management Best Practices

* Development of an asset management policy
* Creating an asset register (GIS) to facilitate analysis and planning
* Implementing a Computerized Maintenance Management System
* Perform condition assessment and renewal/replacement planning
* Implementing an asset management master plan and CIP
* Development of a strategic asset management plan

Pavement Management

Automated Decision Support System
Rehabilitation planning is data driven – operations, condition, capacity, and interrelated projects (paving)

Necessary planning and reporting data is accessible through an integrated databases – GIS, Lucity, CCTV, Hydraulic Models

Data management is built into existing business processes with distributed responsibilities – no excessive burden

Information access is enabled through online tabular reporting, map visualization, and trend charting
Program Elements

GIS
- Asset Inventory
- Asset ID Assignment
- Model Ready
- Visual
- Supports Spatial Analysis

Asset Management
- Inspection Records
- Work History
- Work Management
- Cost Tracking
- Rehabilitation Modeling
## Pipe Rehabilitation Analysis Details - Unnamed Filter Set

### Analysis No
- **Analysis No:** 1
  - **All Pipes Model Run**
  - **Analysis Type:** Basin

### US Structure
- **M20-13**
- **DS Structure:** M21-1

### Work Tasks

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| **Approved** | 1
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| **User 5** | User 5

**User 7** | User 7
| **User 8** | User 8
| **User 9** | User 9
| **User 10** | User 10
| **User 11** | User 11

**User 13** | User 13
| **User 14** | User 14
| **User 15** | User 15
Sewer Mains By Defect Rating and Designated for A Treatment

Sewer Pipe by Defect Rating
- Defect Rating 2 or Less
- Defect Rating 3
- Defect Rating 4
- Defect Rating 5
Sewer Mains with Defect Rating 3 or Greater Designated for Repairs by Treatment Type

- **Treatment 1** - Point Digout
- **Treatment 4** - Point CIPP
- **Treatment 7** - Complete Line CIPP
- **Treatment 8** - Complete Line Replace

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Fontana, California

SOMAS
GIS can be used to design and manage equitable financing and assessment strategies for infrastructure improvement.
Public Notification of Defects

Find community resources, report defects
What is the Future?

- Sensors – everywhere
- Integrated data
- Predictive maintenance
- Optimized infrastructure
Water Utility Challenges

**Infrastructure:** Aging Networks

**Resource:** Water Shortages

**Efficiency:** Energy and Water Losses

**Technology:** Insufficient Network Visibility
Converting Data to Decisions

Raw Data

Tactical Network Knowledge

Strategic Insight

TaKaDu
Managerial Dashboard
Conclusions

- Our public works infrastructure is vital
- We have work to do
- GIS can help us manage in many ways
Contact Psomas for more information about integrated GIS and asset management programs.

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Riverside, CA 92507  
cgooch@Psomas.com  
909.260.6611