Building a Seamless Integrated Asset Inventory at Anchorage Water and Wastewater Utility

Pipe Dream to Reality: A GIS Upgrade Project

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Agenda

1. Who We Are
2. What We Have
3. Where We Were
4. What We Wanted
5. What We Did
6. Why It Worked
7. The Payoff
SECTION 1

Who We Are
Anchorage Water and Wastewater Utility

- Owned by the Municipality of Anchorage
- Serve about 220,000 people
SECTION 2

What We Have
What We Have

- 1,560 miles of water and sewer pipe
- 17,000 manholes
- 3 sewer plants
- 2 water plants
• 6,440 fire hydrants
• 12,000 valves
• 17 water reservoirs
SECTION 3

Where We Were
Redundant Data Maintenance

- Asset records had to be added, retired, and updated manually in both GIS and Maximo
- Manual update process was subject to human error
- Very labor intensive
  - 5 high-end FTEs dedicated to updating Maximo asset data
Poor Design

- Structure for outside/horizontal plant asset data had been created to support Maximo’s hierarchal assets.
- GIS design didn’t easily support storing water distribution and wastewater collection network data.
- Geodatabase design based on an IT “perfect” model, not on one for Water and Wastewater GIS.
Poor Business Process

- Synchronizing data between GIS and Maximo was mostly a manual process which was error prone.
- ArcIMS Geo Spatial Portal made it difficult to make even minor changes to edited feature classes without costly programming changes.
Difficult to Maintain

- Editors struggled to maintain consistency with duplicate data entry
- Data quality degraded despite their efforts
- Work orders created (and completed!) with no asset, incorrect asset, or “phantom” asset
- People were being blamed for bad business process and poor design
Poor Data Quality

Inconsistent

• Only 40% of the asset records in GIS and Maximo could be matched

Data Distrust

• Even on the “matching” asset records, there were data inconsistencies
**Difficult to Analyze**

- Difficult to analyze data for business use
- Systems not used to full potential
- Maximo was not meeting business objectives
SECTION 4

What We Wanted
- **Productivity**
  - Reduce data entry time

- **Reliability**
  - Improve data quality

- **Sustainability**
  - Develop technical expertise to better support GIS and Maximo
What We Wanted

**Better Design**
- Design and migrate to a new GIS model based on Esri’s models for water and wastewater utilities

**Easier Integration**
- Make it easier to automate integration between systems to reduce asset data errors
Easier to Modify

• Separate AWWU’s operational feature classes from its published Geospatial Portal feature classes
• Change the software for our Geospatial Portal to a more configurable (wizard-based) system

Business Value

• Manage assets and work more effectively by spatially enabling our Work Management System
SECTION 5

What We Did
The Solution

- Pragmatic Approach to Data Maintenance
  - Preserved the functionality of both systems
  - Single system of record (no redundant data entry)
Project Started with Workshops

- Defined data ownership and data maintenance business rules
  - Private development projects
  - Private systems projects
  - Capital projects
  - Horizontal maintenance
  - Vertical maintenance
  - Customer connections
As Is Processes were Cumbersome
To Be Processes were Streamlined
Designed New Data Model to Support To Be Processes

- Started with Esri’s simplified Water/Wastewater Model
- Updated model iteratively with staff to meet AWWU’s data needs
- Mapped current design to data model, changing domain values in both models to meet continually refined data needs
Researched Integration Options

- Needed to automate process of GIS assets being added to Maximo
- Wanted to use Maximo’s integration framework
- Looked for solution that would synchronize updates to GIS asset records with the asset data in Maximo
- Chose MaxGIS from EMA since it met our needs
Worked with EMA to Refine Maximo Classifications

- Created 1-to-1 match between Maximo classifications and GIS feature classes
- Focused on horizontal assets since those were the assets we most needed to synchronize
**Implemented Sync Solution**

- **Fixed the Data**
  - Ensured consistency of 50,000 matched assets
  - Retired 5,000 invalid Maximo asset records
  - Added 60,000 missing assets to Maximo
  - Process took 2 weeks because we leveraged the automated tools

- **Started Maintaining the Data**
  - Automated weekly reconciliation (15 minutes)
Implemented New Geospatial Portal

• We implemented a new ArcGIS based Geospatial Portal
  – We purchased MapOptix from GeoNorth
  – Set up new ArcGIS Server to run MapOptix
  – GeoNorth & AWWU configured new “wizard-based” portal in Development
  – Created a move to production process for GIS development to easily move to IT production site

• Result
  – A dynamic portal that is easy to configure to meet business needs
  – Our recent upgrade of this portal to ArcGIS 10 took less than 1/10th the time of past upgrades for our ArcIMS based Geospatial portal
Implementation of New Software

• Editing to published geodatabase made easy!
  – We purchased FME from Safe Software
  – Configured FME scripts to extract, translate, and load data between feature classes and geodatabases
  – Automated the FME scripts

• Result
  – A dynamic, automated process to extract, translate, and load data from our editing geodatabase to our published one.
The Investment

What We Did

$420,000 in Professional Services
$200,000 in Burdened Internal Labor

18 Months
The Outcome

• **Productivity**
  - From 5 FTEs for data entry to 1/100th FTE for Sync

• **Reliability**
  - Improved data accuracy from 40% to 100% match

• **Sustainability**
  - AWWU maintains the solution independently
The Outcome

• Business Value
  – Payback < 3 years
    • Annualized ROI > 40%
    • Ongoing productivity improvement of approx. $500,000 per year
  – Utility can now focus on using Maximo for more effective work management
SECTION 6

Why It Worked
Homework

- Did our Homework
  - Knew which processes needed to be changed
  - Clear vision of end point
    - Invested up front to define the path to our goal
    - Identified the skills and tool parameters needed to augment our staff and systems
    - Created detailed scope
Collaborated

- High level of engagement at all levels of the Utility
  - Cooperative project between IT and Engineering
  - EMA was a partner, not a turn-key provider.

- Ability to flex scope/budget on as AWWU gained proficiency
SECTION 7

The Payoff
The Gift that Keeps on Giving

- Positioned the Utility to streamline other facets of the business
  - Identified ways to improve maintenance processes
  - Improved preventive maintenance routes
  - Improved life cycle costing analysis for long range financial planning
The Gift that Keeps on Giving

• Built foundation for seamlessly integrated asset inventory
  – Integrated Finance Plant Accounting system
  – Integrated hydraulic model
  – Now integrating CCTV and other systems
Questions

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