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Collection System Asset Maintenance & Condition Knowledge: The Conduit to a Sustainable Asset Management Program
“If I had only known what I know today, I would have done things differently”

- Our past experiences DO SHAPE our future decisions!
My Post Consulting Days

- Distinctly different asset challenges:
  - Big City – Old City Issues
  - Small Region – New System Start-up & Growth Issues
  - Canton – Middle Age Issues
Asset maintenance knowledge + asset condition knowledge leads to a “GOOD” Asset Management Program!
Many approaches & tools available depending on resources:

- Simple – Spreadsheet Database & Maps
- Moderate – Basic CMMS & Maps
- Advanced – Fully Functional CMMS w/GIS Data and Other Integrated Applications
Windsor – Operational Objectives

- Secure City Council & community support for long-term infrastructure investments needed
- Evaluate the level-of-service efficiency **AND** cost effectiveness of all activities in Public Works
Windsor - Facts

- Late 1980’s through mid-1990’s
- 225,000 customers/residents
- 758 miles of sewer pipe
- Cleaned once in every 8.5 years
- Productivity management was ingrained in daily operations
Commissioner Harding’s big ask:
  • “Faas….our road & sewer system is falling apart and we need a plan to address that”…oh “and by the way, we likely won’t have adequate funding to meet our needs”
Windsor - Financials

- Operating budgets very constrained
- Departments in competition for City $
  - City Service Forums Held
- Administrative pressure to privatize
- Shrinking residential customer base to absorb future rate increases
Windsor – Asset Condition

- Aging infrastructure - Since 1854
- 20% combined sewers
- Mix of pipe materials
  - Brick
  - Clay
  - Concrete
  - CMP/CSP
  - PVC
- Cases & cases of older VHS tapes
- No one to review the defects
- No rating system for defects
- Fix the “worst first” approach
- Defects logged in the “Grey Matter System”
Windsor - CMMS

- Existing mainframe-based SLIMS
- GIS data was only available for a small pilot area in the downtown
- Implemented a client-server based CMMS (Hansen) starting in the Sewer Division of Public Works
- Used engineering interns/students to do the data input & check plans
Provided a “little too much” data to the City Council to support our case for funding crumbling infrastructure
Began the process to contract-out some activities
Made many activities more efficient & accountable (vehicle oil changes, sidewalk repairs, private sewer lead service, sewer cleaning, etc.)
Developed a usable database to better plan and track O&M activities with the CMMS

Older CCTV inspection data (tapes) was simply archived due to limited resources

Set up area-wide recurring work Orders for sewer cleaning crews
WTUA - Operational Objectives

- While the assets are still relatively new “let’s do the right thing”
- Determine the current and future improvements needed to sustain a rapidly growing area
- Resolve the operational issues left over from start-up
WTUA - Facts

- Mid-1990’s through 2003
- 125,000 customers/residents
- 29 miles of sewer pipe (Interceptor)
- 18 miles of force main pipe
- Collection system NEVER cleaned or inspected (O&M focus was on pump stations)
Operating budgets not constrained
Operations privatized from the start
Growing residential customer base to absorb $200+ million capital investment made & projected future rate increases
New infrastructure – Since 1992
100% separated sewers
Mix of pipe materials
- Brick (small %)
- Clay (small %)
- Concrete (interceptors)
- CMP (small %)
- PCCP (force mains)
Existing PC-based CMMS (Datastream MP2)

- GIS data was available from customer communities
- Implemented a stand alone CMMS (GBA Master Series) using GIS data
- Field checked manhole structures with GPS survey by consultant
- Began shifting O&M focus from pump stations to collection system
- Utilized GIS Aerial Mapping to support CMMS & rubber sheeted as-built drawings to fit
Worked out start-up bugs and shifted from finger pointing to problem solving environment

Developed a five-year collection systems O&M scheme

Enabled staff to develop a five-year CIP for rehab of the collection system
Canton – Operational Objectives

- Before old age hits “let’s do the right thing” (PM vs. CM focus)
- Equip our staff with dependable information when it’s needed
- Make knowledge-based decisions
2003 through present
- 90,000 customers/residents
- 338 miles of sewer pipe
- Cleaned once in every five years
- Until Nov 2005, focus was on growth
- Since early 2006, focus has shifted to maintenance
Early years we were “Flush with Cash”
Currently budgets are very constrained due to depression of property values (>20% Since 2007)
Projected to be back to 2007 values by 2018
Stable residential customer base (85% of Water & Sewer Revenues)
Canton - Financials

- AAA Bond Rating was downgraded by S&P to AA+ in Spring of 2011
- Cash balance in Water & Sewer Fund decreased from $48 million (10 years ago) to $11 million (2011)
- Cash balance still healthy (33% of Budget), after three years of double digit rate hikes
Canton – Asset Condition

- 100% separated sanitary sewers
- Mix of infrastructure age:
  - New (<25 Years Old)
  - Middle (26 to 50 Years Old)
  - Older (50+ Years Old)
- Canton is rapidly reaching “middle age”, if one assumes that:
  - Asset Condition is a Function of Age?
Canton – Asset Condition

- Mix of pipe materials:
  - Clay
  - Concrete
  - ABS Truss (majority)
- Lots of knowledge = hand colored maps with hot spots clearly marked, VHS tapes & DVDs
Robust GIS data since 1990
Aerial images flown every 2-3 years
In-house CCTV technician is NASSCO-PACP certified & a trainer
Collection system defects found are normally corrected within 6-12 months DOB
GPS located all sanitary & storm manholes, pump stations, valves, hydrants, curb stops, ponds, etc.

- Developed a data model for assets
- Implemented a client-server based CMMS (Cityworks) in the DPW
- Retained some desktop apps as well
Cityworks was phased-in including sewer, water, stormwater, sidewalks, DDA, parks, fleet, etc.

- Used interns/students to refine the data input from the GIS
- Full-time O&M staff verify data in the field (perpetual commitment)
Canton – Business Approach

- Contracted-in Engineering Plan Review & Inspection Services
- Use Track-it Software to bill any time spent by staff on projects
- Engineering Services Manager Reviews monthly invoices for each project (Including projects generated through Cityworks CMMS)
Canton – Business Approach

- Adopted private sector model with multiplier on hourly pay rates
- Applicable to Private & Public Projects
- Target is to have staff bill 85%
- Multipliers are different:
  - 1.40 X Hourly Rate (Public)
  - 2.82 X Hourly Rate (Private)
Multiplier math made simple:

- All Direct Staff Costs Added In => 1.00
- Fringe Benefits Are Added => 1.40
- Other Direct Expenses (Mgt & Sup) Added
- Other Indirect Expenses Added
- Other Two Lines Add Another 1.42
- Grand Total Multiplier = 2.82
Multiplier has been audited against Federal Government Guidelines to ensure billable rates can be used for In-kind services match as part of grant reimbursements.

As Canton reduces its workforce, the indirect expenses have decreased.
Eight years into this and I want to say “Sure it’s working great”, but…

- Staff spend a % of unproductive non-billable time entering time into Track-it Program
- Staff resistant at first (why?)
- Manager has added PM duties
Revenue recovery back to operating budgets from private sector deposits and/or public CIP accounts lags 4-6 weeks, so tracking is complicated.

- Staff are more accountable for time.
- Developers love it.
CMMS enabled us to rapidly switch from growth focus to maintenance focus
Harnessing 20 years of GIS data that was underutilized previously
CMMS allowing staff to better prioritize repairs and plan future maintenance needs
Knowledge about our assets is finally being stored digitally versus in Jake’s “Grey Matter System” (GMS)

- As senior staff retire, the information retained is slowly being integrated into the systems we use each day
So What’s It All Mean

- Knowledge about your assets is key
- Past experience will shape & hopefully improve future outcomes
- **You Can Do This**; whether large, small, young, old, or just middle aged!