Managing a City’s Sewer System in a Sea of Snow

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J. Whitten, K. Quinlan, S. Lopez
“MVPC promotes community and regional collaboration and innovation; plans for the strategic growth and development, and assists in regional development economically, efficiently and with an eye to the future.”
Winter 2014-2015

WBZ AccuWeather
Seasonal Snowfall So Far

- Burlington: 76"
- Bangor: 117"
- Portland: 89"
- Syracuse: 107"
- Albany: 76"
- Worcester: 109"
- Boston: 102"
- Hartford: 55"
- Providence: 60"
- New York: 28"

 Definitely a bad winter in New England!
“Historic” Winter

A costly sewer system failure on Plum Island

Sewage problem on Plum Island

Plum Island sewer system failure displaces hundreds
After three messy weeks of frustration, Plum Island fixes its system and residents can start returning home

Meeting the challenges of so much snow, sewerage outage

Help for Plum Island's sewer woes
More money allocated to study problems
Today’s Discussion:

- “Geo-orientation”
- The Data
- Solutions
Vacuum Sewer Systems

How AIRVAC Works:

1. A traditional gravity line carries wastewater from the customer to an AIRVAC valve pit package.

2. When 10 gallons of wastewater collects in the sump, the AIRVAC valve opens and differential pressure propels the contents into the vacuum main.

3. Wastewater travels at 15 to 18 fps in the vacuum main, which is laid in a sawtooth fashion to insure adequate vacuum levels at the end of each line.

4. Wastewater enters the collection tank. When the tank fills to a predetermined level, sewage pumps transfer the contents to the treatment plant via a force main.

Vacuum pumps cycle on and off as needed to maintain a constant level of vacuum on the entire collection system.

Photo Credit: Bilfinger Airvac Water Technologies Inc.
Next...

- Kelsey - the data, the needs, the products
- Steve - putting it all together, the public
Data Collection

Develop a plan to collect pertinent features to the island's sewer system
Mobile Collection

- Divided island into 4 sub areas for ID scheme
- Worked with knowledgeable DPS staff member
- Collected approximately 1800 features
- Two months
Vent Pipe (Candy Cane):

- No existing dataset
- No record of which homes tied in
State of the Data

Vacuum Pit:
• Provided with “as builts”
• Incorrect locations
• Unknown Quantity
• Don’t know which home is connected to which vacuum pit
State of the Data
Attributes

Vent Pipe:
- Height
- Obstruction
- Angled
- Broken
- Building Adjacent

Vacuum Pit:
- Vacuum pit ID
- Street name
- Last maintenance
- Controller status
- Condition

Trimble GeoExplorer6000
Mobile Collection

Challenges
Review Process

The “Fruity Pebble” Map
Review Process

Drawing the Connections
Verification Process

Annual AirVac testing

• Test timing of system
• City confirmed home – vacuum connections at the same time
Defining the objectives:
• Who will use the application?
• What does the application need to accomplish?
• How will the application be used?
App Development

- Public Works
  - ArcGIS for Server
    - Residents
      - JSON
    - ArcGIS Online
      - Web Map
        - City Website
          - Viewing
          - Mobile Application
            - Viewing & Editing
Why use the ArcGIS App (aka the Green App)
- Staff familiarity
- Existing infrastructure
- Cost
- Security
Mobile App
Public Works

How does staff benefit?
• Locate assets
• Inspections
• Edit/Update system status
Why use web a map?

- Simple to create
- Easy interaction
- Dynamic data
How do residents benefit?

- Search for information
- Receive updates in real time
The future...

- Ongoing operation of apps
- Evolve systems as technology advances
- Expand maintenance attributes
- Integration with AirVac SCADA
Questions

Jerrard Whitten GIS/IT Manager
jjwhitten@mvpc.org

Stephen Lopez Senior GIS Analyst
slopez@mvpc.org

Kelsey Quinlan GIS Analyst
kquinlan@mvpc.org