

# Hillsborough County, Fla.'s Sewer Asset Management Program



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*[EDITOR'S NOTE: This is the first in a three-part series. This paper examines the Hillsborough County sewer inventory and condition assessment program. During the next article, the authors will present the findings of their work and how they would improve data collection, data management and condition assessment. In the final article, the County's gravity sewer asset management program will be discussed.]*

Hillsborough County (Fla.) Water Resource Services (WRS) provides water, wastewater and reclaimed water services to approximately 150,000 accounts or about 400,000 customers in Hillsborough County, Fla. WRS was originally formed in the 1970s by purchasing many small franchise utilities. In the early '80s WRS began a major construction program to regionalize the system into two service areas, eliminating all franchises. The County has been growing at a rate of from 3 to 4 percent annually since then, and most of the capital projects have been devoted to expanding capacity to meet demands. Currently, WRS has more than \$1.2 billion dollars worth of infrastructure that it manages, of which the majority may be approaching the end of its useful life in the next 15 to 20 years.

Approximately eight years ago, WRS identified the need to better plan for the renewal and replacement (R&R) of its assets. At that time, WRS created a 20-year capital program that included significant funding of R&R projects, significant rate increases and major refinancing plans that allowed it to

shift to a pay-as-you-go capital finance plan. Five years later, WRS realized that it needed to implement a new, comprehensive asset management system to deal with its upcoming aging infrastructure, predominantly reactive maintenance programs and the wide assortment of software systems that did not communicate with each other. WRS formulated an advanced asset management strategy that included the design and procurement of an enterprise-wide, sophisticated Computerized Maintenance Management System (CMMS) as the heart of a larger Comprehensive Asset Management System (CAMS). To fully implement the CMMS system, it was determined that accurate and complete data would be necessary for the system to be fully utilized.

The strategic aspects of the project involved defining what is an asset, determining what attributes were appropriate to collect for each asset, evaluating the CMMS software to see what information could be stored and utilized for reporting and long-range planning purposes, evaluating the current available techniques for inventory and assessment, and determining the appropriate procurement methodology. Since WRS treats and distributes water and reclaimed water, and treats and collects wastewater, the evaluation was broken down into two parts, aboveground assets at plant or pump stations sites, and linear assets of the collection and distribution systems.

After reviewing the current inventory and assessment techniques as well as standard condition coding criteria, the assets

were further broken down into four groups for purposes of procuring and performing the inventory and assessments. Group One consisted of manholes and gravity pipes. Group Two consisted of hydrants, valves and large meters. Group Three consisted of plant and pump station equipment. Group Four consisted of pressure pipes.

Since standard methodologies exist from the National Association of Sewer Service Companies (NASSCO) for the condition coding of manholes and gravity

lines using camera equipment, these methodologies and numerical scoring criteria were chosen for use with Group One. The inventory portion of the Group One work was specified to use GPS equipment with survey grade accuracy. This accuracy was desirable to incorporate the exact data into WRS's wastewater modeling program. Since no standard inspection criteria of methodologies for assessment exist for the remaining groups, it was determined to evaluate the condition related to the remaining useful life of the asset which could then be converted to a numerical value or categories of good, poor etc. This assessment would be performed by using a combination of visual inspection, age and standard decay data, and some field testing where applicable. The inventory portion was specified to use GPS equipment with map grade accuracies.

Currently, WRS is in the process of performing the Group One inventory and assessment work and has completed the Group Three work. The Group Two work was recently awarded and the Group Four work will be awarded shortly. All work is scheduled to be completed by September 2008 at an estimated cost of \$16 million. By breaking the assets into groups and performing competitive procurements, WRS can collect the necessary inventory and assessment data in a timely and cost-effective manner to support the success of its Comprehensive Asset Management Program.

The gravity sewer inventory and condition assessment project began in May of this year. This paper presents an overview of the project and describes the project-planning phase. Future articles will discuss the results obtained from work and how the information will be used by WRS to support enhanced management of the gravity sewer system.

## Background

Hillsborough County is located midway along the western coast of Florida. The County has 1,048 square miles of land and 24 square miles of inland water area for a total of 1,072 square miles. The unincorporated area encompasses 909 square miles, or more than 84 percent of the total county area.



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Municipalities account for 163 square miles. The 2005 county population was reported by the Planning Commission to be 1,147,140.

The Hillsborough County gravity sewer system includes approximately 1,300 miles of gravity sewers ranging in size from 4 to 42-in. in diameter. The collection system contains approximately 33,000 manholes constructed of brick and precast concrete.

In May 2006, WRS hired InfraMetrix LLC of Tampa, Fla., to conduct a county-

wide inventory and condition assessment of the entire collection system. The two-year project, scheduled for May 2008 completion, includes:

- Collecting GPS (x, y and z) coordinates for 33,000 manholes and 50,000 sewer cleanouts
- Inspecting 33,000 manholes and approximately 1,300 miles of gravity sewer using stationary closed circuit zoom camera technology developed for InfraMetrix by CUES Inc. of Orlando, Fla. (the CUES/IMX zoom camera)
- Cleaning and in-line closed circuit television inspection of 1.5 million ft of the county's collection system
- Evaluating the service (maintenance requirements) and structural condition of the inspected manholes and pipelines
- Populating the GIS and SPL Enterprise Asset Management software with manhole and pipeline attribute data collected by the GPS, zoom, CCTV and condition assessment teams

## Project Objectives

The gravity sewer inventory and condition assessment project will verify and update WRS's current sanitary sewer system information and provide a comprehensive understanding of the physical characteristics and condition of all of the gravity sanitary sewer assets. For the condition assessment, NASSCO Pipeline Assessment Certification Program (PACP) certified viewers will assess the maintenance and structural condition of WRS's manholes and gravity sewers. All of the information collected in the field using the CUES/IMX truck-mounted zoom camera, including the results of the condition assessment of manholes and pipelines, will be entered into the SPL Enterprise Asset Management Software.

Populating the software with the physical characteristics and maintenance and structural condition of the gravity sewer system assets will allow the county to address the aging infrastructure and maintenance needs of the sewer system as well as prioritize operation and maintenance and capital expenditures based on an assessment of the risk of failure of each asset.

## Field Inventory and Condition Assessment Procedures

During the field program, the project team will obtain survey-grade X, Y and Z coordinates of all accessible manholes and cleanouts. The GPS coordinates will accurately locate the assets in the GIS and provide vertical data for hydraulic modeling of the sewer system. After the GIS is updated, the zoom crews will be deployed to collect the physical, service (maintenance requirements) and structural attributes for each manhole and pipeline.

During the deployment of the CUES/IMX camera, each manhole and pipeline will be inspected and recorded on electronic media. Each manhole and pipeline entering and leaving each manhole will be inspected. The project team will build, validate and/or correct the current inventory, operating condition and mapping information of the collection system using information collected by the zoom camera crews. The video information and physical characteristic information collected by the zoom crews will provide the basis for development of a proactive operation and maintenance program (cleaning and in-line pipeline inspection), a renewal and replacement capital improvement program (CIP), and improved accuracy of the hydraulic models of the sewer system. The video inspection files will provide a record of the current condition of the sewer system, critical information should the county experience hurricane damage to the sewer system and seek FEMA funding for sewer debris removal or structural repair for the sanitary sewer system.

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The manhole and pipeline videos will be reviewed by a team of PACP-certified viewers. The viewers will consider safety issues, structural defects, evidence of previous infiltration and inflow, active infiltration sources, and debris accumulation recorded during the zoom camera inspection to determine an internal condition grade of the pipeline in accordance with the NASSCO PACP standards. After the internal condition grade is determined, an external grade will be assigned to each manhole and pipeline. The external grade will provide a basis for evaluating other factors that may influence the risk and impact of backups, overflows and failures.

InfraMetrix will perform cleaning of all pipelines approved by WRS for cleaning or more detailed in-line inspection. These pipelines will be cleaned, televised and

evaluated to obtain a final operation and maintenance and structural condition grade. At the completion of the inspection program, WRS will receive condition attribute data for scheduling future maintenance and renewal and replacement capital projects.

InfraMetrix is currently conducting a 1,000 manhole pilot study. The pilot study will demonstrate the data collection, sewer assessment and data management process and procedures that InfraMetrix will perform to execute the countywide inventory and condition assessment. The Pilot Project will be completed in October 2006.

In the next article on this project, the project team will report the inventory and condition assessment results, challenges and benefits realized during the implementation of the project.

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