GIS FOR WASTEWATER COLLECTION O&M

By Lindsey Sylvester, PE

Wastewater collection systems can be simple or complex in their location, type, or connectivity, and inspecting them as part of a good operation and maintenance (O&M) program often requires exploring innovative techniques to get the necessary answers. Did you know Geographic Information Systems (GIS) can be used to improve traditional approaches to wastewater collection system O&M? This article describes three helpful techniques.

Night Flow Isolations via CCTV Inspections

Night flow isolations are the traditional approach for selecting specific pipes to perform closed-circuit television (CCTV) inspections when trying to identify defects that contribute to inflow and infiltration (I/I) into the sewer collection system. Night flow isolation involves taking instantaneous flow measurements in smaller sized areas during the night and early morning hours and determining if any flow originates from the pipe itself. Generally, wastewater production is expected to be lowest during these times, so the flow measured would be unwanted infiltration. However, during drought conditions, this method is not effective because there is little or no groundwater to enter the pipes through existing defects.

When this situation occurred during a three-phased sewer system evaluation survey (SSES) project in the city of Greenfield, MA, Wright-Pierce used GIS to determine the most likely locations for I/I. Using the City's pipe database and topographic data, pipes were selected for inspection based on age, pipe material, and proximity to drain lines, wetlands, and streams. These criteria were used to determine the most appropriate pipes for inspection, and the team ultimately found just over 50% of those pipes selected needed repair or immediate corrective action.

Mobile GIS Applications

Using mobile GIS applications can improve efficiency when conducting SSES field investigation activities, such as smoke testing and dye testing. With customized, automated applications for these tasks, not only can field crews collect data more quickly, but the data are also available immediately to assist with coordination between crews, owner-operators, and managers for analysis.

Smoke testing and dye testing are typically used to identify locations where storm sewers or other inflow sources are directly connected to the wastewater system. These can include catch basins, roof leaders, floor drains, area drains, and manholes. Smoke testing can also identify breaks in sewer laterals as long as they are close enough to the surface, ground conditions are dry, and the groundwater table is low.

Using a GIS application enables a field crew to pinpoint an inflow source on a map and associate photographs of observations made in the field with that point. When combined with other sources of data, such as CCTV and manhole inspections, you can start connecting the dots between defects and sources of I/I.

GIS for Tracking OSHA ComplianceAnother innovative application includes using GIS for tracking compliance with organizational safety policies and federal regulations, such as those of the Occupational Safety and Health Administration (OSHA). Whether it is a manhole, wet well, or tank, crews can use a mobile GIS application to complete and store required confined space entry forms online from the job site in a quick and accurate manner, with automated location information included. Staff and managers can easily see where and when confined space entry has occurred, track progress on a project, and monitor compliance. Individual forms can be reviewed online, viewed on a map, or printed for documentation in a hard copy format if needed.

Wright-Pierce has an in-house infrastructure assessment group and GIS team that can work with you to implement these techniques to help improve your collection system O&M. When applied properly, these methods reduce time and effort, increase efficiency, and lower costs for municipalities.

Our New York office is located at 6 Executive Park Drive, Suite B in Clifton Park. Contact us today at 888-621-8156 to learn more.