City of Winter Haven, Florida

Lift Station Operation Soars to New Heights with Intel from Real-Time Remote Sewer Monitors

Case Study

Background

Water quality is a major concern in Winter Haven, FL, also known as the Chain of Lakes City. The rapidly growing city is surrounded by 74 waterways. Protecting those waterways is a priority for the Winter Haven Water Department's Wastewater Division, which maintains 232 lift stations that support 330 miles of gravity wastewater mains in the 31.3-square-mile service area, and two wastewater treatment facilities that manage five million gallons of wastewater a day.

The Challenge

More frequent heavy rain events raised concerns among Winter Haven's wastewater staff about how to more proactively manage inflow and infiltration (I&I) and how to help reduce sanitary sewer overflows (SSO) that can cause flooding, compromise waterways and impact public health. The staff sought greater understanding of its lift station network and how to better respond to emerging conditions that could provoke spills.

Winter Haven had tried to prevent SSOs using the EPA's capacity, management, operations, and maintenance (CMOM) program, which includes using backup pumps, frequent cleaning without intel, and various flow reduction measures to maintain the integrity of sewer pipe capacity.

Other issues Winter Haven needed to address:

- Replace an outdated slow-notification system that relied on residents to call an answering service to report an alarm. The small staff worked in reactive mode responding to the alarms, often arriving after a problem had escalated.
- Improve response times and be more proactive and safe assessing and addressing issues before they become big problems.
- Reduce lift station backups.
- Reduce SSOs and lessen the environmental impact.

The Solution

Winter Haven's Wastewater Division adopted real-time remote monitoring technology in 2000 to optimize its lift station operation and to improve overall performance. The city acquired the SmartCover TCU001, a Telemetry Control Unit. The TCU001 is a pump controller used as Winter Haven's Supervisory Control and Data Acquisition (SCADA).

Highlights

- Reduced SSOs nearly 70%
- Prevented 60 SSOs with real-time alarms in FY2023
- Utilized SNAP to identify high-risk locations based on spill probability
- Deferred $400,000 in equipment replacement costs

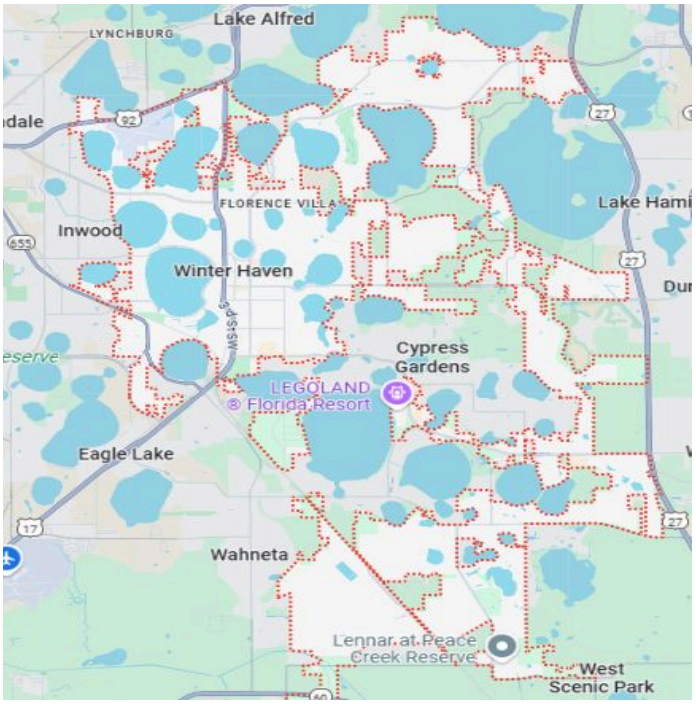

Figure 1: Winter Haven, FL is called the Chain of Lakes City because it is surrounded by 74 known waterways

Figure 2: The green squares show Winter Haven's lift stations.

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One TCU can monitor up to three pumps, using level input from floats and/or pressure transducers. The system uses radio communications. Deployment of 200 TCUs and 15 Programmable Logic Controllers (PLCs) monitor the lift stations to ensure the pumps run properly and to detect rising levels of wastewater due to wet weather events or obstructions within sewer pipes.

The Results

Winter Haven gained actionable insights into its lift station network, giving staff time to assess and respond to emerging surcharges and other issues that could trigger SSOs. Deployment of 200 TCUs and 15 Programmable Logic Controllers (PLCs) monitor the lift stations to ensure the pumps run properly and to detect rising levels of wastewater due to wet weather events or obstructions within sewer pipes.

Daily Pump Activity Reports include information about average run time for each pump and how long pumps took to lower wastewater levels before they shut off. The data also helps generate historical data for comparisons.

The reports allow for immediate troubleshooting of issues and increased safety for crews. Staff no longer must make frequent trips to check on the status of lift stations miles apart or respond to alarm sites, often in confined spaces, without intel about the situation.

Figure 3: Winter Haven's master lift station

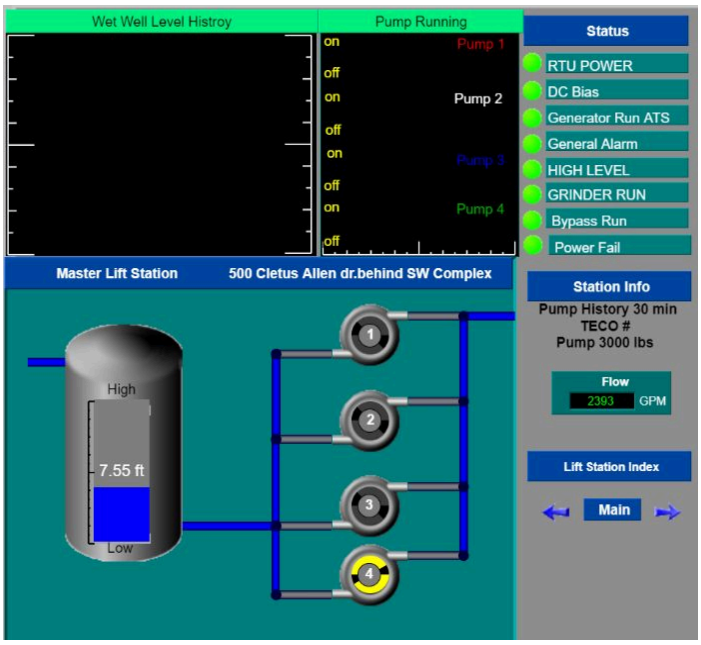

Figure 4: Custom screen showing activity at the master lift station

Conclusion

Using the SmartCover monitoring systems Winter Haven has optimized its pump station operation. SSOs have steadily decreased. The SSO reduction was aided by intel from daily pump reports, alarm configurations and improved response times. Additionally, the utility has improved community relations and minimized environmental infractions due to SSOs.

Because of its success with the SmartCover TCU001, Winter Haven will install three newly released TCU800s, with cellular-based communications, by the end of 2024. Looking ahead, Winter Haven has plans to expand the use of SmartCover's suite of solutions beyond just monitoring the lift stations. Operators want the ability to remotely turn pumps on and off, especially when fats, oils, and grease (FOG) accumulate and hinder float balls from penetrating the muck to detect wastewater levels. FOG poses a frequent and costly challenge for sewer systems because they cause blockages and corrode pipes.