I&I Studies with Isco Flow Loggers

Falls City, Nebraska USA

Case Study

TELEDYNE ISCO
Everywhereyoulook™

Expertise in Flow

The 2150 Flow Logger and Rain Gauge from Teledyne Isco, Inc. are integral elements of the Sanitary Sewer Collection System (SSCS) in the city of Falls City, Nebraska.

Isco 2150 Flow Logger

- Portable area-velocity flow logging
- Reliable and quality measurements
- Rugged IP68 protection for deployment in sewer networks
- Variable data storage
- Digital electronics ensure stable readings and long battery life
- Remote cellular and radio communication options available

Isco Rain Gauge

Applications:

- Inflow and Infiltration studies
- Stormwater Runoff monitoring
- CSO monitoring
- cMOM & CSO/SSO overflow monitoring & prevention
- General rainfall measurement

"The Future of Flow!"™

Falls City, Nebraska

Falls City, population 5,000, has over thirty-seven miles of sanitary sewer pipe, with the majority of pipeline consisting of vitrified clay tile, and ranging in diameter from 6 to 18 inches. Replacement with modern PVC pipe over the years has been minimal. The plant also utilizes 44,000 square feet of reed beds for dewatering and concentration of solids for future land applications. With heavy rains, severe Inflow and Infiltration (I&I) periodically overwhelmed the collection system, nearly doubling the amount of water for which the treatment plant was designed, washing out the biomass and creating surges in operating costs. During these events, the plant had to be staffed for manual diversion and control. Pumping and treating all of the extra water took large amounts of time and caused extra wear and tear on the equipment.

WWTP during fair weather

WWTP during flood conditions
(photo taken prior to 1995 construction)

Falls City WWTP

The Challenge

In order to avoid further structural damage and leakage, the SSCS needed to identify the areas in the sewer network where I&I was a problem and restore the pipes by replacing the tile with updated materials. The capital costs associated with relining the pipes (approximately $10,000 per block) meant the plant would have to know precisely where to concentrate municipal funds and efforts.

Flowlink Software

- Data analysis
- Diagnostics
- Graphs/tables
- Editing

2150 Modules in Manhole:

"I like Flowlink software. I don't know a better tool out there to pinpoint I&I this fast and easy."
–Doug Wheeler, Plant Manager

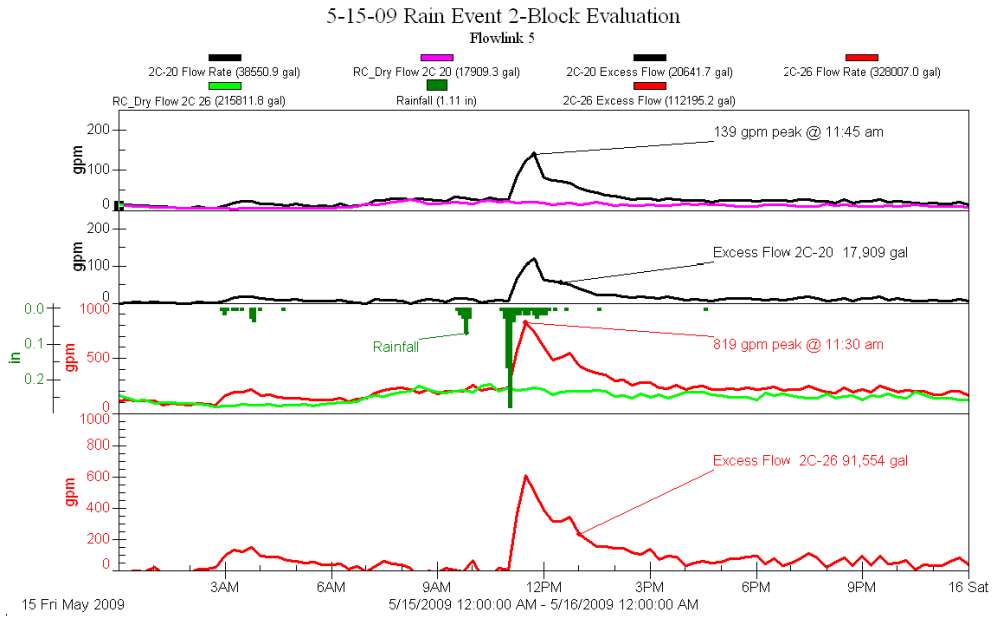
The SSCS explored several leak detection methods. Smoke testing required dry weather and extra manpower. Renting flow monitoring equipment was expensive, and the timing of wet periods was difficult to predict. Under such constraints, there was little time to become familiar with the equipment, the amount of data to process could be overwhelming, and extra manpower was required to pull the equipment, evaluate the data, and move the equipment to new areas. A closed-circuit TV truck system runs cameras into the pipe network; however, camera use is inhibited by flood conditions during crucial rain events, and no rainfall or flow data can be collected for analysis.

Then, in the spring of 2008, the plant purchased several Isco 2150 Area Velocity flow modules.

Solution: Isco Model 2150 Flow Modules and Model 676 Logging Rain Gauges

The 2150 flow module uses Doppler technology with a digital AV probe to measure and record flow data in normal and rain event conditions. The 676 logging rain gauge measures and records precise rainfall data. Both sets of data are retrieved with Isco's powerful Flowlink® data management software for analysis. With strategic installation of the equipment, the crew quickly began to home in on the problem areas. For example, on May 15, 2009, a two-block section experienced a surplus of nearly 92,000 gallons within a period of 24 hours, as seen below in Figure . The light green and magenta reference curves represent average flows in each block seen during normal dry conditions, while the red and black lines depict actual flows and peak flows during the 24-hour period in question. The graph shows maximum rainfall at approximately 11a.m., quickly followed by peak flows, accurately recorded for both blocks and clearly showing where the greater I&I was occurring.

Since the implementation of the Isco monitoring equipment, the plant has been able to accurately flag some of the city's problem areas using Flowlink with reference to hydro modeling from GPS coordinates.



Rain event in Falls City, May 2009
Reference curve graphically depicted with Isco Flowlink® software

Teledyne Isco
P.O. Box 82531, Lincoln, Nebraska, 68501 USA
USA & Canada: (800) 228-4373 • Phone: (402) 464-0231 • Fax: (402) 465-3091
Web site: www.isco.com • E-mail: IscoInfo@teledyne.com

TELEDYNE ISCO
Everywhereyoulook™