

Remote Wastewater Overflow Protection

Company: JEA, City of Jacksonville, Florida

Contact: Rodney Williams, Water Wastewater Reuse Reliability Specialist
(904) 759-1683

Introduction

JEA is the municipal utilities provider for Jacksonville Florida. They were facing a problem with sanitary sewer overflows (SSO) in the downtown section of Jacksonville. Avoiding sewage overflow, aside from being a safety, environmental, and public relations necessity, is good business for JEA.

Objective

The engineers at JEA needed a way to monitor underground sewer levels throughout the city. The plan involved the placement of measuring devices in strategically located manholes around the city in order to monitor the various fluid levels at each location.

This approach required the city to install power and control circuits at the strategic locations. Since the manholes were proven to be a very harsh Class1, Division 1 environment, they knew that the solution was not going to be easy. JEA had already invested in a very robust SCADA system to control and monitor over 1200 lift stations. The end goal was to locate a monitoring system from the sewer manhole to the existing SCADA system.

About

The issue faced by Jacksonville in establishing a monitoring system is that the city itself is physically in the way— buildings, bridges, communication lines, power lines and other typical city fixtures. They would need to dig up most of the downtown at a cost of millions of dollars and months of traffic congestion and delays. The idea was proposed to monitor the manholes and their levels wirelessly. This solution could provide the city with a quick way to install a solution that would not require the demolition of the entire city.

A search was conducted to determine who could provide a solution that fit a very specific list of requirements. These requirements included the necessary power to send signals through the ground and steel manhole covers wirelessly to receivers located in control cabinets within the city; the need for ultra low power consumption; the ability to power the solution via batteries; be contained in a Class 1, Division 1 enclosure; the ability to send both analog and discrete signals; and be portable so it could be moved to different locations in the city as needed. After extensive field tests and evaluations for signal strength and durability, along with careful evaluation of different types of equipment, a Weidmüller wireless solution was selected.

The components of the solution include a compact, easy-to-use wireless transmitter (WI-I/O-9-K), coupled with its matching battery pack (WI-BP-I/O-9-K), which does not require any special OEM batteries. The wireless transmitter sends analog and discrete signals to a wireless transceiver (WI-I/O 9-4). This unit collects the data from each transmitter and forwards it via a wired connection into the JEA's SCADA application. The receiver works very well with the existing SCADA system. The programming software for the devices is provided for free via web download, and is easy to use and understand.



The software that is included with each device makes it simple for JEA to map the transmission of signals and control transmit schedules, thus prolonging battery life. Based on the level of power consumption, JEA could replace the batteries once a year, however, they have implemented a proactive battery maintenance program to change out the batteries (standard AA sized Alkaline) every 6 months.

These wireless devices are mounted in a Class 1, Division 1 explosion proof enclosure with a small external antenna. Each enclosure unit is then placed in a cradle within the manhole. Portability is an important feature because it allows JEA to redeploy each wireless radio in other locations in the city as needed.

The transmitter sends signals from each underground manhole installation to set receivers through the downtown area. JEA teamed with a local distributor and packaged the Weidmuller radio system, enclosure, terminals, and equipment needed to meet application requirements of this monitoring system.

Outcome

This wireless manhole monitoring system has been used in 17 manholes in Jacksonville. It was implemented in just six months at a savings of millions of dollars and many months of time, versus a wired solution.

The system has proven to be a very successful solution to an important problem. Since the implementation of the manhole monitoring system, JEA has successfully prevented numerous manhole sanitary sewer overflows (SSO), thus protecting the public and the environment— a top priority for JEA and the city.

