Water/Wastewater

Customer case study

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INSPIRING INNOVATIONS

Wastewater treatment plant goes wireless

Plant finds success and security in SCADA system

Highlights

- A Pennsylvania wastewater treatment plant relied on a hard-wired data network, but increasing demands on service required a SCADA upgrade
- Phoenix Contact and Kapsch partnered to create a wireless network built around Kapsch's DYNAC software and Phoenix Contact's FL WLAN 5101
- The new network helps the treatment plant serve its customers with the high level of professionalism, quality, and flexibility that they expect

> "Making sure that our wastewater is treated effectively, and provides environmental protection, is really important."
>
> **Liesel Gross, CEO of LCA**

Customer profile

Lehigh County Authority (LCA) is a public water and wastewater utility in Allentown, Pennsylvania. LCA serves more than 150,000 residents with their water and sewer services. The utility treats about 32 million gallons of wastewater each day before it is discharged to the Little Lehigh Creek prior to entering the Lehigh River.

Challenge: Time for an upgrade

The water/wastewater business is a hidden utility for a lot of its customers. It is common for people not to have a second thought about where their water goes, once it is down the drain. Despite the "out of sight, out of mind" mentality for many, wastewater operations are incredibly important and vital to public health. Many wastewater systems and lift stations are spread across several miles, some in isolated areas, which presents a number of obstacles when monitoring and controlling these facilities.

The Lehigh County Authority's main wastewater treatment plant – nearly a century old – needed an upgraded SCADA system to accommodate increasing demands.

Like most industries, the water and wastewater business has kept up with the trends and emerging technologies. Supervisory Control and Data Acquisition (SCADA) software is becoming the norm among municipal authorities, large and small, across

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the country. It has proven to be a critical part of treatment plant operations. SCADA enables centralized monitoring and control management, quicker alarm response times, reduced manpower, increased system reliability and cost-effectiveness, and a strong sense of security. Alarm data can be transferred easily to smart devices.

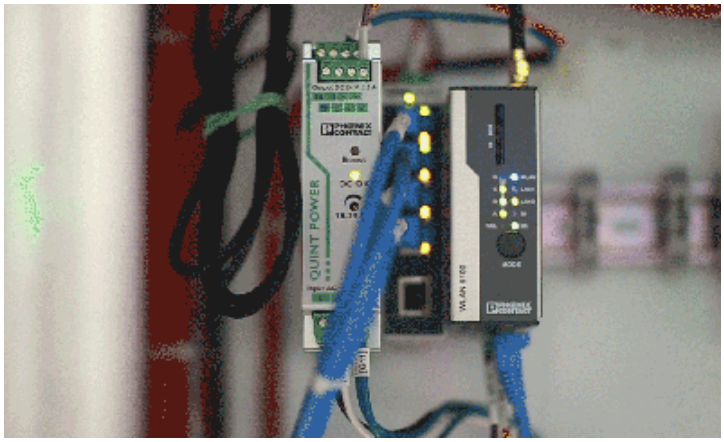
Nearly a century old, the LCA wastewater treatment plant has undergone a handful of upgrades and renovations. Prior to the installation of the SCADA system, LCA relied on a hard-wired Data Highway plus (DH+) network. The old system was unable to accommodate the increasing demands of their service.

"It was literally stretched to its limits," George Lill, LCA SCADA analyst, said. "Distance-wise, we really couldn't add anything to it."

The dated system required a large amount of manual labor to trench for conduit to get to the designated location. The DH+ protocol caused a great degree of inconsistency and unreliability for the facility. With the wire run as long as it was, communication was constantly severed and yielded frequent drop-outs.

A Wi-Fi solution offered the highest bandwidth for the geography and topology of the facility.

In 1995, LCA partnered with Kapsch TrafficCom USA, Inc., an international IT and telecommunications company. At that time, Kapsch provided a SCADA solution for the water filtration plant, and the company has continued to work with LCA on other upgrades during the past 20 years. When it was time to upgrade the wastewater facility, LCA returned to Kapsch to provide a similar solution.



The FL WLAN 5101 offers high-speed wireless networking up to 300 Megabits per second.

Solution: Wireless provides advantages

LCA originally considered a fiber-optic or copper hard-wired solution before Kapsch performed a radio study. Receiving just a general objective from LCA to upgrade the communication infrastructure, Kapsch recommended a Wi-Fi radio solution. Because the plant is not too dispersed and holds few obstructions, a Wi-Fi radio solution proved the best option, yielding the highest bandwidth for the geography and topology of the facility.

Having collaborated on several SCADA wireless communication solution projects with Phoenix Contact, Kapsch turned to them once again for products, support, and technical expertise.

Phoenix Contact's FL WLAN 5101 offers high-speed wireless Ethernet communications up to 300 Mbps. Its robust metal housing measures just 40 mm wide, so it saves valuable DIN rail space. It also has Class I, Division 2 approval, which is required in many wastewater facilities.

The radio was paired with Kapsch's DYNAC software to provide a plant-wide control system. DYNAC is a SCADA software designed to monitor and control numerous types of alarm conditions and other situations. Operators can remotely perform routine system diagnostics to ensure that the pumps are ready for operation at any time, all from a single HMI.

With the new wireless Ethernet network, all existing programmable logic controllers (PLCs) were upgraded and linked

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to the redundant database server in the main pump house. The wireless system allowed for instantaneous access to necessary information, such as water levels.

Results: Community expansion and education

When designing and implementing a wireless system, cybersecurity is a big concern.

"You always hear about someone hacking into a system and opening valves, at least in our industry," Lill emphasized. "The Phoenix Contact radios have a lot of security; they have passkeys, and after we installed them and we saw the security on them, we were very happy with them."

The implementation of the wireless solution has proven much more reliable than the dated existing DH+ communications network. It maintains a strong connection, even through heavy rain and wind. It also has reduced labor costs.

"Going wireless saved us all that time and money of actually having to run conduit and the fiber or the copper to the locations. It was very cost-effective and much easier," Lill said.

LCA strives to serve its customers with a high level of professionalism, quality, and flexibility. With the implementation of a wireless solution, these goals are met in a much more secure, efficient, and reliable way.

DYNAC software makes it easy to monitor and control pumps around the facility, and operators can view all system conditions at any given time through the HMI in the main pump house.

Liesel Gross, CEO of LCA, stated, "Making sure that our wastewater is treated effectively, and provides environmental protection, is really important. For us to undertake a project to automate our controls and operate the system through automated controls is important for our operators. It has increased efficiency, security, timeliness of response, and really optimized the overall plant operations."

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