

Cutting-edge treatment

Cobb County Georgia taps Siemens automation to improve wastewater treatment operations

Case study



The Noonday Creek plant feeds clean, treated water into Noonday Creek.

Cobb is one of metropolitan Atlanta's most populated counties. Nearly one million people call it home. Millions more work, play and visit inside the borders of this suburban stretch of neighborhoods, businesses and parks. The infrastructure is among the area's best and getting better. The Cobb County Water System (CCWS) is a strong case in point.

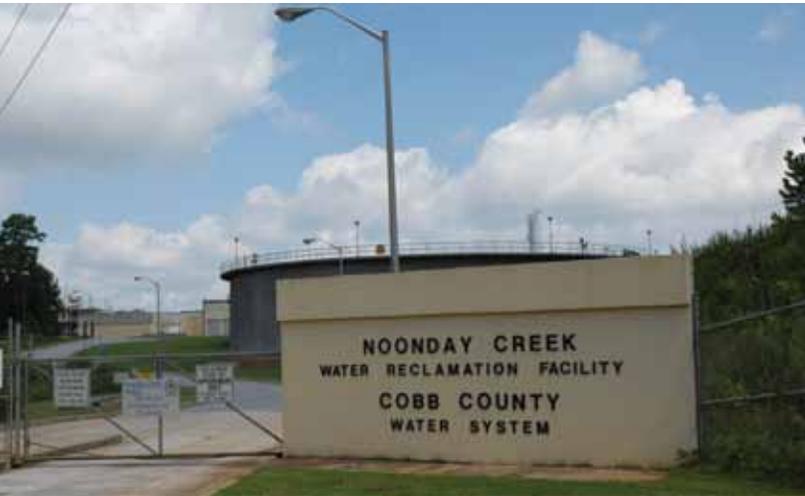
The CCWS is fully capable of handling three to five times more than the combined 80 million gallons of sewage and runoff it currently processes daily through four regional treatment plants. The aging SCADA system that monitors and manages the facilities, however, is due for a major upgrade, as the county gets hit with the costs that come with lost productivity and inefficiencies.

The biggest challenge facing technicians charged with upgrading the operation was identifying and implementing a solution capable of seamlessly unifying the CCWS. The four primary plants and 42 pump stations, which direct wastewater from neighborhoods and developments scattered throughout the 345 square mile county, had been deployed over time by an assortment of integrators.

"Our old architecture was disjointed and aging," explained Pat Brechbill, technology support manager for the Cobb County Water System who heads up a team of seven process control analysts and six instrumentation technicians. "So, we focused on implementing a future-proof plant upgrade capable of providing our staff with a clear view into the whole wastewater treatment system. The main goal is to give our engineers, maintenance teams and operators real-time, anytime plant access from virtually anywhere."

Plant unification was the top priority, but other lofty objectives loomed. The elimination of cumbersome and complicated license management procedures was high on the punch list. Time-consuming programming and troubleshooting requirements had to go too, along with outdated graphics and screens.

The Technology Support Group considered a new release of the plant's twelve-year-old SCADA software. But after months of research and brainstorming all available options, the team instead initiated a full blown replacement to leverage the full potential of the existing Siemens PLC (programmable logic controller) platform across much of the CCWS operation.



Noonday Creek plant entrance



iQuest's Bob Meads, Lou Kennebeck and Tim Alderman can check out the status of the Noonday Creek plant from virtually anywhere using Web Navigator

With a Siemens PLC platform already in place throughout the system, the Technology Support Group opted to standardize the upgrade on the Siemens S7-300 and S7-400 series of PLCs. "The synchronization of our PLC and SCADA software platforms was critical. We had to implement a system we knew would grow and expand together," said Brechbill, who ultimately decided to replace the old SCADA with Siemens' web-based WinCC solution.

Unleashing the plant's full potential

"The S7 series is an extremely powerful PLC platform, fully capable of communicating with different network layers simultaneously. Most integration software can't do that," Brechbill detailed. "By marrying the Siemens PLC with the WinCC SCADA, we can get the most from our architecture and our plant far into the future."

Once the system-wide upgrade is complete in late 2012, all the plants and pump stations will be operating on WinCC and accessible through online portals using Web Navigator. "We want to ensure that everyone who's authorized to operate and maintain the facilities can easily and quickly get as much information and feedback from the plant as possible, but in a safe, secure and authorized manner" said Brechbill. "WinCC and Web Navigator put the whole system at their fingertips. That plant-wide view just wasn't possible before with our limited SCADA."

Using built-in plant viewing stations or even laptops at home or on the road, operators, maintenance and engineering crews can see the entire CCWS or drill down to the device level in any facility to monitor, program or troubleshoot. "We can utilize Web Navigator for web access to anything in the HMI," noted Bob Meads, president of iQuest, a preferred Siemens solutions integrator.

"Before, we had to use a dedicated desktop unit and a limited license pool to manually access the plant," Brechbill explained. "Our new web-based SCADA enables portable licensing that allows us to log on at the plant or anywhere, use an online license to see the plant, make the changes and log off," Brechbill explained. "That's a powerful solution that is saving us money and time and opens the door to tremendous capabilities we didn't have before."

Prior to the upgrade, when a maintenance technician signed on for a license to check a particular plant, "the operator had to be hands off during the troubleshoot effort," explained Meads. "That often meant operators went an hour or more without a view into the plant, while they waited for the manual license to return to the pool," Meads added.

The new plant architecture was planned from the outset of the project. "We sat down with Siemens and some of their trusted solutions consultants to make sure we set a sound foundation for the long haul," said Brechbill. "The WinCC SCADA platform unleashes the full potential of the Cobb County Water System," explained Meads. "Operators, engineers and maintenance teams at the Noonday Creek plant are already reaping the benefits of automated maintenance and management tools," he noted.

Changing a pop up screen in the old system, for example, required the programmer to go to every pop up to make the alteration. "Now our pop ups are global, so we make the change to one pop up and every identical screen is updated automatically," Brechbill explained. "That's a huge time and cost savings. What used to take four hours or more is done in five minutes."



The CCWS technical team of Tim Alderman, Dan Machado, Walt Rittenhouse, Pat Brechbill and Lou Kennebeck rely on Siemens WinCC



Process control analyst Walt Rittenhouse gets a bird's eye view of the Noonday Creek plant with WinCC

"Because plants like CCWS feature objects and processes that require redundant programming and setup, Siemens and iQuest have helped us globalize everything we can possibly globalize," said Brechbill. "The biggest benefit is far more productive plant maintenance and management," he added. "WinCC enables integrators to automate configuration," noted Meads.

Building on success

iQuest managed the first plant upgrade at the Noonday Creek facility in Kennesaw, Georgia, creating a model for the technology refresh at Cobb's other three treatment plants. "Because we've standardized on the Siemens PLC and WinCC SCADA, Cobb County can reuse all the screens and templates created for the Noonday plant in upgrades at the other system facilities," said Meads. The South Cobb plant in the Austell community is nearing completion, the Northwest treatment site in the town of Acworth is on deck and the Sutton plant in Smyrna will be revamped by December 2012. None of the plants will shut down during the high tech renovation.

"The S7 PLC series design allows us to implement WinCC in parallel with our old SCADA system," explained Brechbill. "As a result, we could beta test WinCC while running the old SCADA at Noonday. Once testing is completed at each plant, the migration to WinCC will be seamless and simple."

The CCWS hit a wall with its aging SCADA system and couldn't build on the investment made years ago. "Now we're positioning ourselves to take advantage of Siemens' TIA (Totally Integrated Automation) platform. That will enable our operations staff to easily integrate and leverage new technologies and applications in the future," said Brechbill, who envisions plant access on smart phone and handheld devices fast approaching. "The more portable and flexible the

access, the more our teams will know what's going on across the plant," he noted.

One of the mission-critical strengths of the Siemens S7 series PLC is its networking capabilities and design to communicate simultaneously with multiple servers. While other software packages, including Cobb's old SCADA system, rely on a fail-over platform with a primary server, the Siemens PLC and SCADA platform delivers the same data at the same time to every server. "Network glitches used to cost our maintenance crews a lot of time, as they would have to remote in and manually publish data to the servers. We don't have to do that anymore," said Brechbill.

The Technology Support Group is rebuilding the networking infrastructure of the CCWS in part based on the innovative work done at Orlando's Iron Bridge wastewater treatment plant. He and his core team toured the facility that underwent its own system-wide Siemens upgrade built on the WinCC and S7 PLC platforms.

Self-sufficient solution

When Pat Brechbill first joined the Cobb County Water System as a programmer five years ago, he was new to Siemens PLCs. "I quickly realized how powerful the Siemens PLC platform truly is and how it enables you to innovate on the architecture side," Brechbill said of his introduction to Siemens.

Now that the Noonday Creek plant upgrade is complete and the learning curve is a thing of the past, operators and support teams "are more confident than ever in their plant management capabilities," said Brechbill. "Now that we've got the exposure of two upgrades under our belt and a real comfort level with the intuitive SCADA software, our plan is to be self sufficient with the next two plant upgrades and ongoing management," he noted.

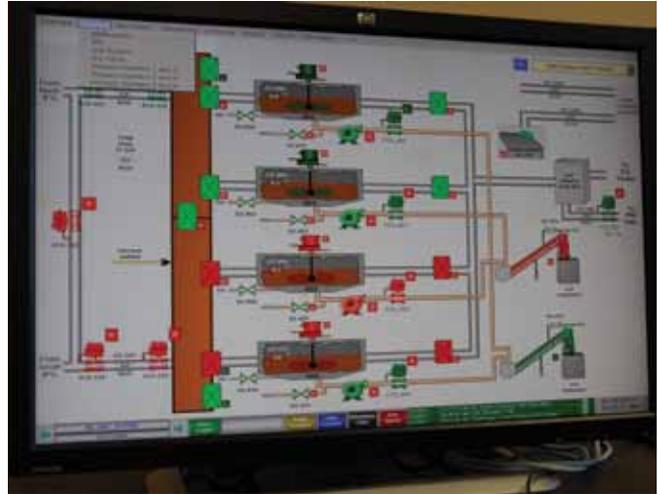
Should CCWS hit any hurdles, "we've got people like Bob Meads at iQuest and Bill Wood at Orlando's wastewater treatment plant who have the expertise to help when we need it," Brechbill explained. "Cobb County now has a standardized, revamped and efficient wastewater treatment system that the staff can easily manage and maintain," added Meads.

Cobb County estimates self sufficiency could lead to triple-digit savings at the Northwest plant alone. "There's a huge cost savings that comes with self sufficiency in engineering and plant set up," Brechbill said.

"The intuitive nature of WinCC allows us to do much of the work ourselves, to the tune of at least \$150,000 in just engineering cost savings at the Northwest facility."

It's difficult to put a price, however, on what Brechbill considers one of the biggest benefits of the upgrade – a new level of confidence in the operation and the clean water it's putting back into the area's rivers and streams.

"We've always produced reusable water at our plants, but our system upgrade will no doubt enable us to further enhance our processes and the quality of water destined for the Chattahoochee River, Noonday Creek and other waterways," explained Brechbill. "Siemens provides the integrated and robust solutions we must have to run a unified operation capable of meeting the needs of Cobb County today and tomorrow."



Siemens WinCC screens have simplified operations across the Cobb County water treatment system



A Siemens S7 PLC runs a remote view station at the Noonday Creek plant

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