



THE CITY OF WESTON, FLORIDA

STAYING A STEP AHEAD OF THE STORM WITH MOTOROLA SOLUTIONS AND STAR CONTROLS SCADA STORMWATER PUMPING SYSTEM

The city of Weston is a master-planned community located in southwestern Broward County, Florida. The city boasts A-rated schools and outstanding public safety with the lowest crime rate per capita in the county. Encompassing 26 square miles and bordering the Everglades National Park, Weston's vibrant, culturally diverse residents and visitors enjoy a thriving outdoor-focused lifestyle.

Yet, this area can be subject to extreme weather that can deluge the city with large amounts of water in a short period of time. In an average rainy season, the city can see up to 45 inches of rain, with individual storms capable of dropping 10-15 inches of rain or more over just a few days. To prevent flooding, the city uses an extensive stormwater management system, directing water runoff through a system of catch basins, culverts, retention ponds and pumping stations, which eventually flow to the Everglades.

As a city with a population of approximately 70,000, Weston only employs a staff of five technicians to manage its stormwater system, so all operations need to be as efficient and reliable as possible. Yet, its stormwater pumping system was largely based on manual monitoring and operating functions, making it difficult for technicians to manage while also performing their other daily responsibilities. Weston sought a new way to control and automate the system.

CUSTOMER PROFILE

The City of Weston, Florida

INDUSTRY

Water Management

SOLUTIONS

Integrated SCADA IoT Stormwater Pumping System, including:

- Motorola Solutions MC-Edge Intelligent IoT Gateway
- Motorola Solutions ACE3600 Remote Terminal Unit (RTU)
- Star Controls StarCS Cloud SCADA

BENEFITS

- System automation and remote-control capabilities mean Weston can spend more time on its core mission
- Rich data is collected and shared with deep reporting capabilities through an easily accessible web-based portal
- Cybersecurity and overall system health is bolstered to comply with CISA's (Cybersecurity and Infrastructure Security Agency) Cybersecurity Practices for Industrial Control Systems

CHALLENGES

MANUAL PUMP MONITORING AND MAINTENANCE MADE SYSTEM OPERATIONS INEFFICIENT

Like many cities in South Florida, Weston sits less than 10 feet above sea level, so any excess stormwater can quickly impact the community. That means that the public works department must closely track incoming storms as well as the daily functionality of the city's stormwater pump system. Historically, drainage technicians were assigned to manually check lake levels, clear any blocked drains, and ensure that all water could easily flow.

During the rainy season, technicians would conduct these checks every morning and when on high alert, several times throughout the day. Anytime a decision was made to turn on the pumps, someone had to manually drive out to turn them on and then return to base. Then, they had to drive back every eight hours to monitor performance. When it came time to turn the pumps off, the same technicians would have to drive back to manually shut them down. If a moderate or major storm was predicted, monitoring and preparation was even more time consuming, threatening to slow response times when speed was needed most.

"When a storm was coming, up to 50% of our technicians' time would be spent managing and monitoring these systems," said Peter Johnson, City of Weston Assistant Director of Public Works. "With the size of our department, that made it more difficult for staff to handle other duties and was simply an inefficient use of their time."

A LACK OF QUALITY DATA COMPLICATED DECISION MAKING AND HINDERED DISPLAY OF REAL-TIME INFORMATION

Weston's stormwater pump technicians and managers are tasked with making important system decisions daily, including when to start the pumps, how much water to pump, and how long to run the pumps. Yet, Weston would receive very limited actionable data from the system's mostly manual control processes, making it more difficult to make the best, most informed decisions possible. In addition, when the U.S. Army Corps of Engineers would look at the feasibility of new infrastructure projects in or around the city, they would often ask for historical data that was very difficult for Weston to produce.

This lack of quality, actionable data was compounded by the fact that the city's ability to share information with residents, such as real-time lake levels was inefficient.

"Data from our pumping system was very hard to gather," said Johnson. "And even when we had access to the right data, we didn't have the means to easily share it instantly with the community."



WITH RISING REPORTS OF INFRASTRUCTURE BREACHES NATIONWIDE, WESTON WANTED TO DO MORE TO ENSURE CYBERSECURITY AND OVERALL SYSTEM HEALTH

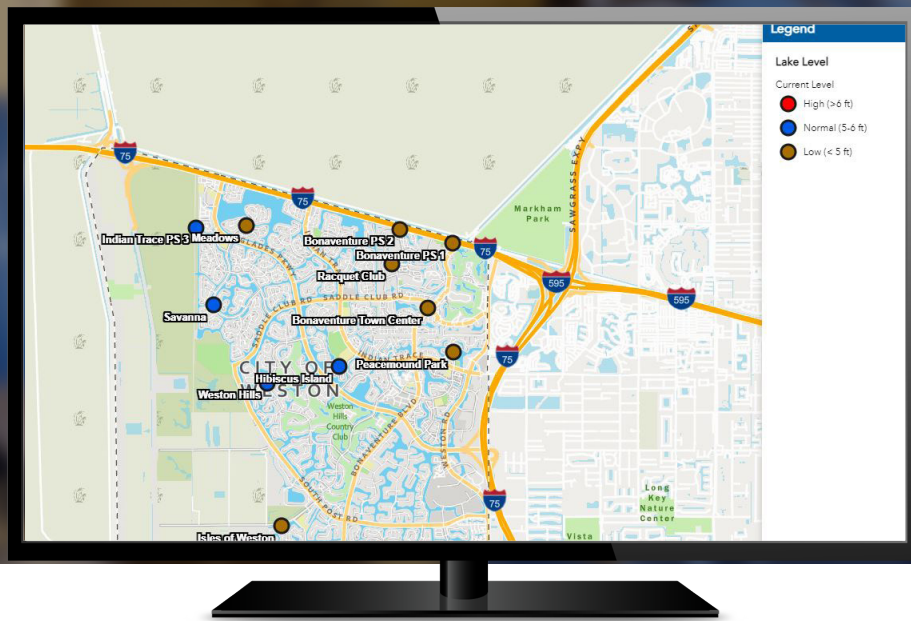
While Weston knew it needed to upgrade the control system for its stormwater pumps, it also wanted to ensure that any new system was monitored for overall health and especially protected against cyber breaches, for good reason.

According to International City/County Management Association (ICMA) research¹, local governments are increasingly targeted by cyber criminals and bad actors for five main reasons:

1. The sheer number of American local governments make them a large attractive target.
2. Local governments store considerable amounts of sensitive information, such as names, addresses, driver's license numbers, credit card numbers, social security numbers, and medical information.
3. In recent years, the availability of low cost but effective hacking tools that require little technical knowledge has made it relatively easy to get into the business of cybercrime, thus increasing the number and types of cybercriminals.
4. Local governments often operate under financial constraints that limit their ability to acquire and implement state of the art cybersecurity technology, policies, and practices.
5. As local governments connect infrastructure to the internet it can introduce new cyber risks and vulnerabilities.

Knowing these risks, it was important that any solution Weston installed was tested and certified to comply with CISA's (Cybersecurity and Infrastructure Security Agency) Cybersecurity Practices for Industrial Control Systems.

It was also important to have a partner that could monitor the system and alert the city to any suspicious activity or issues that could affect the system's overall health.



SOLUTION

The City of Weston chose Star Controls, a Motorola Solutions partner, to design, build, and install a SCADA IoT system that could automatically monitor city water levels and control pumping stations to redirect water as necessary. The city also made the decision to migrate its IT and associated applications to the cloud, so its SCADA system needed to be cloud-hosted as well. "The City has progressively moved many of our core software applications into the cloud to benefit from the reduced cybersecurity liabilities. In addition, the cloud provides us the ability to easily access applications from anywhere at any time," technology services director, Ryan Fernandes, stated.

"It pained me to see people wasting time and efficiency," said Johnson. "We knew technology was there to save time and effort and we made the decision to move forward with it."

The system utilizes the Motorola Solutions MC-Edge Intelligent IoT Gateways and ACE3600 Remote Terminal Units (RTUs) to monitor remote pumping and lake levels, collect data, and remotely control pumps and other equipment. Data collected from the system is forwarded to a cloud-based application which uses measured water levels and other inputs to direct stormwater as necessary. The use of Motorola MDLC protocol allows redundant schemes of communication between the remote sites and cloud-based control centers. In addition, the system includes site security, fire alarms, and intrusion detection.

"The Motorola Solutions RTU is the only field controller that can easily act as the integrator for all these pieces," said Tzvi Magril, Star Controls Managing Partner and Co-Founder. "We can develop applications using a common programming language to remotely check on the health of each piece of the system, which is unique to the Motorola Solutions platform."

Weston city staff worked closely with Star Controls on the design of its SCADA system using all off the shelf products, with cloud-hosted software.

"We chose Star Controls and Motorola Solutions because they made the best suggestions on overall project design and could help us build and maintain a powerful, integrated, and secure system," said Johnson. "Plus, everyone knows Motorola Solutions is an established, trustworthy company."

BENEFITS

SYSTEM AUTOMATION AND REMOTE-CONTROL CAPABILITIES MEAN WESTON CAN SPEND MORE TIME ON ITS CORE MISSION WHILE RESPONDING TO STORMS FASTER

Today, Weston's entire stormwater pumping system can be remotely monitored and controlled, with the option to run in two modes, an automatic mode based on city water levels and a manual override mode, when needed.

With all applications and data hosted in the cloud, it's easy for technicians to see each pump's status and control them remotely, even from a mobile phone or computer browser.

"Recently, we had a fast moving, unexpected storm," said Johnson. "In the past, that would have meant a call to a technician in the middle of the night or waiting until morning. This time, we simply turned on two pumps with our mobile phones. When there's a problem or an issue, we can react immediately."

During Hurricane Ian, Weston was spared a direct hit but still received 7 inches of rain in one day, further testing the new system. Based on data coming from the system, Weston lowered the lake levels in preparation.

"We had a huge jump in confidence knowing we had full control of the system," explained Johnson. "We didn't have to worry if things were working, we could actually monitor everything in real time. Staff were elated that they didn't have to drive to each station to check on pumps since they could manage everything remotely."

Technicians were now freed up to do other storm prep and related tasks. We were busy tracking the weather forecast and monitoring the performance of operating pumps. Everything just worked perfectly."

Daily monitoring and maintenance is now vastly improved as well. For instance, the pumping system automatically monitors power coming from the local utility, so it knows if power is interrupted and can send alarm when running on backup generators. Fuel levels for diesel operated pumps are also automatically monitored.

Remote lake level sensors also provide a clearer picture. Since lakes are connected underground by culverts, it's important to see all adjoining communities to monitor for blockages. When they occur, Weston sends in divers to clear them before the rainy season. Now, they can see the status of the lakes and culverts at all times using color-coded charts viewed remotely through any web browser or at the public works office on a 75-inch display. When there's an issue, automatic alerts are pushed to technicians' cell phones via voice, text and email.



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- Peter Johnson, City of Weston Assistant Director of Public Works

EASILY ACCESSIBLE RICH DATA WITH DYNAMIC REPORTING

Weston now has access to both detailed, real-time data and rich historical data, whenever needed. For instance, they can see lake levels over time and gauge how the system performed under different scenarios. When the South Florida Water Management District requests specific data, it's easy for staff to quickly pull it using integrated and powerful reporting capabilities that all run in the cloud and can be accessed from any authorized device.

"Data collection is a huge benefit to us," said Johnson. "We can respond faster and more comprehensively to specific requests, but just as important, we can learn from past historical data and get better with time."

In addition, because all data and applications are hosted in the cloud, Weston can easily share information such as lake levels with the community, straight from their city website.

BUILT WITH SECURITY IN MIND

Weston's stormwater pumping system relies on the Motorola Solutions MC-Edge Gateway and ACE3600 RTU, each designed to comply with CISA's Cybersecurity Practices for Industrial Control Systems.

The Motorola Solutions MC-Edge Gateway also allows integrators to easily develop their own software to monitor the health of the field computer and surrounding environment, making the system even more secure.

"Motorola Solutions has been providing an open platform for customers to develop on for years," said Magril. "Others just don't offer the same level of flexibility or ease of use."

In addition, with the StaRTU software residing on the Motorola products, Star Controls will help maintain the system, monitoring for breaches, looking to see how components are communicating with each other, and tracking general performance. If there's an issue, Weston can be much more proactive with maintenance or remediation.

AN EXAMPLE FOR OTHER CITIES

Today, Weston's Cloud-Based SCADA for stormwater pumping system is a reference point for other cities. "This is ahead of its time. Most cities strive to have a system of this type that is so comprehensive and advanced," said Johnson.

Weston is also thrilled with their decision to host all system software and data in the cloud. "That's important because most cities with their limited resources don't have the ability to keep up with the management of a secured data center," explained Johnson.

Overall, Johnson would highly recommend this type of system to others thinking of upgrading their stormwater pumping systems.

"Most things come down to value," he said. "This investment is worth it. It's not inexpensive, but when you total the full amount it takes to maintain a manual system and the confidence and benefits you get from the automated system, it's worth it."

And the best part?

"Because the software is in the cloud, management and security is improved" said Johnson.

For more information about intelligent IoT and SCADA solutions, visit:
motorolasolutions.com/iiot



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