SmartSights

CASE STUDY | WATER TREATMENT

Grand Forks Hybrid Water Treatment Plant Positively Impacts Community

LOCATION
Grand Forks, North Dakota

INDUSTRY
Water & Wastewater Treatment

WEBSITE
grandforksgov.com

CHAMPION
Pete Aamold

After six years of planning and construction, Grand Forks, North Dakota, recently began operation of the Grand Forks Regional Water Treatment Plant (GFRWTP) in mid-2020. The $134 million, 250,000 square-foot complex is one of the most technologically advanced facilities of its kind. The goal of the project is to provide the city's residents and industries with potable water. Additional key targets include reducing seasonal taste and odor issues, and meeting any upcoming water regulatory requirements.

Advanced System

GFRWTP operates as a hybrid facility utilizing both a conventional and membrane system for water treatment. From the general pretreatment area, the water is pushed through to a conventional system where the water is treated by traditional lime softening, ozonation, and biological filtration method or to the revolutionary membrane system. The membrane system starts with the ultra-filtration technique then moves to three reverse osmosis skids, each containing multiple membrane vessels that pull particulates from the water. The water is blended at the end of the two systems.

The new hybrid water treatment plant also serves as the city's monitoring hub for its 45 wastewater lift stations, 12 stormwater stations, and 12 flood stations. To meet the project's goals and oversee these stations to ensure there isn't any unplanned downtime requires a lot of behind-the-scenes robust technology.

High-capacity reverse osmosis water treatment plant.

Photo Credit: All images provided by City of Grand Forks

Technology Upgrade

Monitoring at the previous 60-year-old water treatment plant depended on operators in a control room 24/7 to manually acknowledge alarms and notify the appropriate engineers via radio or phone calls. All storm, lift, and flood stations received communications through the water treatment plant because it was the only facility with staff on-site 24/7. Because of the new facility's dramatically increased size, greater oversight responsibilities, and the previous facility's ongoing radio interference, Fred Goetz, manager of GFRWTP and the operations team, Tod Matelski, wastewater treatment (WWT) manager, and Pete Aamold, wastewater collections (WWC) supervisor, knew this was no longer a viable solution.

The City of Grand Forks contracted with AE2S, a specialized civil/environmental consulting engineering firm, as the project consultant and advisor. They worked together to select a software company whose SCADA system would manage the different utilities' equipment. After a rigorous presentation process, the City of Grand Forks and AE2S conducted a selection grading procedure among key stakeholders. The City then reviewed this matrix and ultimately chose AVEVA System Platform as the SCADA solution, which was presented by Wonderware Midwest.

AE2S configured the architecture so the servers are in one building and housed under one System Platform galaxy. While this provides congruent standardization, each department is now responsible for their own assets. Each of the three System Platform Operations Management Interface view applications has features that are unique for each department, too.

Ozone is mixed with side stream water and injected into the basins for disinfection in these ozone gas manifolds.

> *"The WIN-911 mobile app allows us to see who on the team is looking at the alarm, talk with each other, and respond. Overall, the remote alarm software and mobile app are a big improvement from operators sitting in a control room communicating via the phone or radios"*
>
> ***Pete Aamold***
>
> *Wastewater Collections Supervisor,*
> *Grand Forks Water Department*

Cohesive Departments

Together, GFRWTP, WWC, and WWT make up the City of Grand Forks Water* Department. While much of the work focused on the flagship treatment plant project, both WWT and WWC also received software system upgrades. These software upgrades have now allowed the operators to have remote control access to these facilities. Along with the software upgrades, the 69 remote collection sites were converted from an antiquated radio system to a new cellular-based telemetry system.

Grand Forks Water Treatment Plant

Remote Alarm Notification

Production levels at the new facility are as high as 16 million gallons per day in the water treatment plant, monitoring the water, wastewater collections, and the wastewater facility is serious business. Any aberration in the flow, water quality issues, or a chemical feed could be extremely detrimental.

To relieve the operators on site in the control room at the water treatment plant from the sole responsibility of receiving and dispatching alarms, AE2S recommended integrating the AVEVA System Platform with SmartSights WIN-911 remote alarm notification software. This upgrade means that while this facility is still the only one staffed 24/7/365 and remains the monitoring hub, the staff are no longer solely responsible for dispatching alarms.

SmartSights WIN-911 alarm software provides constant remote monitoring and assurances to prevent any problems. Alarm notifications are dispatched via the software's mobile app, which allows the team to respond and discuss—within the app—the state of the alarm and how to quickly resolve each issue, offering GFRWTP, WWT, and WWC a cost-effective and reliable solution.

"The mobile app allows us to see who on the team is looking at the alarm, talk with each other, and respond. Overall, the remote alarm software and mobile app are a big improvement from operators sitting in a control room communicating via the phone or radios," commented Aamold, an industry veteran with 30 years of experience with the Grand Forks Water Department.

Contact basin where water coming in is being mixed with lime and chemicals for softening and to settle out the solids.

**Water, wastewater, and stormwater are separate public works departments*

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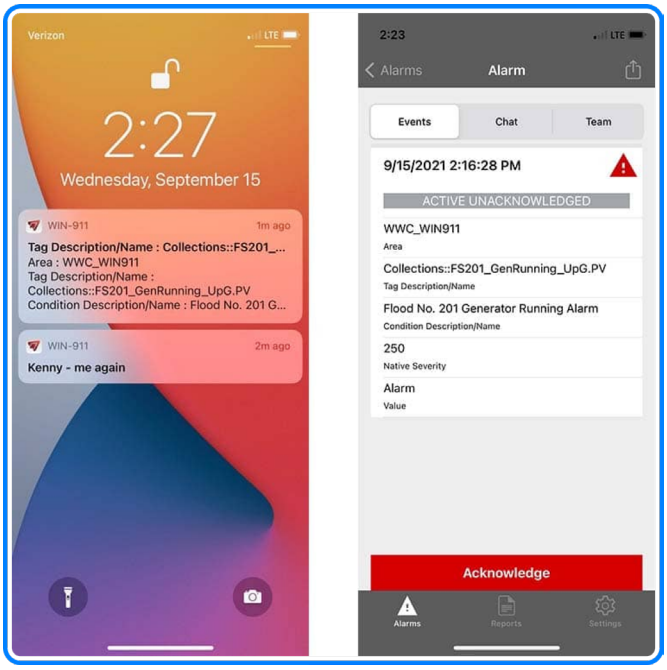
>
> ***Tod Matelski***
> *Treatment Manager,*
> *Grand Forks Water Department*

Unique Equipment and Ongoing Monitoring

The WWT's intricate system is continuously monitored by the AVEVA System Platform and WIN-911 to ensure safe and effective processing of the wastewater that is brought in from the collection area. These include monitoring chemical levels like sodium hydroxide and polymers, as well as skimmers, air blowers, and a state-of-the-art UV system.

Also being continuously monitored is a sophisticated Microbubble Flotation (MBF) system that extracts solids and other particles from the water before discharge. While most water utilities also remove particles from the bottom, the MBF system uses high-pressure air blowers to aerate the basin and force the particles to the top where they are skimmed off.



WIN-911 alerts for Grand Forks Water Treatment Plant

Remote Monitoring Averts Problems

One recent WIN-911 mobile app alarm was able to alert the team that the high-pressure header system for the aeration blowers, which can only handle a specific PSI, was ramping up too high to accommodate the intake. When the team received the notification, they adjusted the levels via AVEVA System Platform, which then processed the wastewater at a safer pace and avoided detrimental equipment damage.

"The mobile app not only lets the team know where the potential problem is located, but we also have it set up in the facility to report exactly what situation is occurring," added Matelski.

In addition to this being the largest building construction project in Grand Forks' history, the plant, city administrators, and design partners achieved their goal of implementing a cleaner and more efficient hybrid water treatment system.

The GFRWTP is making a positive impact on the Grand Forks community and sets the city up for future expansion. Upgrading the SCADA system and integrating it with WIN-911 remote alarm notification software ensures there isn't any unplanned downtime, the three departments are working together cohesively and emergencies are avoided.

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