CASE STUDY

EAST BAY REGIONAL PARK DISTRICT

MultiSmart Pump Station Manager

The East Bay Regional Park District (EBRPD) is designated a special district by the state of California. It is the largest special district in the United States, with over 90 percent of its land protected and operated as natural parklands.

EBRPD is responsible for 1,745 square miles of land, encompassing both Alameda and Contra Costa counties on the eastern side of San Francisco Bay. It manages 29 park trails, 65 parks, camping and recreation areas, lakes and lagoons, wilderness, shorelines, fishing docks and preserves as well as education centers and conference facilities.

With an annual budget of $140 million and nearly 700 employees, the District is so big that it has its own police department with 62 police officers. There are also ten fire stations and a full-time, on-site helicopter unit. For such a large and widely spread District, effective management of water and waste water is critical. The supply of potable water, and waste water collection and treatment, needs constant monitoring and control across all facilities to prevent problems and avoid any possible environmental issues.

New Five Year Planning

The man responsible for the electrical/ mechanical pumping and control functions in the District is Richard Guest.

"We used to have an amalgam of antiquated and largely incompatible equipment to control 38 pumping stations. Some waste water pumps dated back to the 70s," said Guest.

"Two years ago I developed a 5-year plan to modernize all waste water plants and pump stations. The objective was to develop a highly reliable, centralized control system that is simple to operate, and can accommodate SCADA with minimal adaptation.

However, I had to consider our many employees who transfer within the District on a regular basis, and a significant number of part-time and seasonal employees as well. It became crucial to standardize every panel, so employees would not have to relearn how to operate unfamiliar equipment when they moved around. We also wanted a simple, user-friendly configuration. Simplicity is key to a well managed, smooth running operation."

In the past, the District's water and sewer pump stations had no communications ability at all. Visual inspection was the only way to identify a problem at a pumping station, and any failure had to be addressed on-site.

After extensive review of pump control systems, MultiTrode's MultiSmart Pump Station Manager were selected by EBRPD for their proven reliability plus modular expansion and open interface capabilities. Other positive considerations included easy installation and simple, intuitive operator controls. The MultiSmart controllers combined ease of use with advanced functionality for up to 9 pumps.

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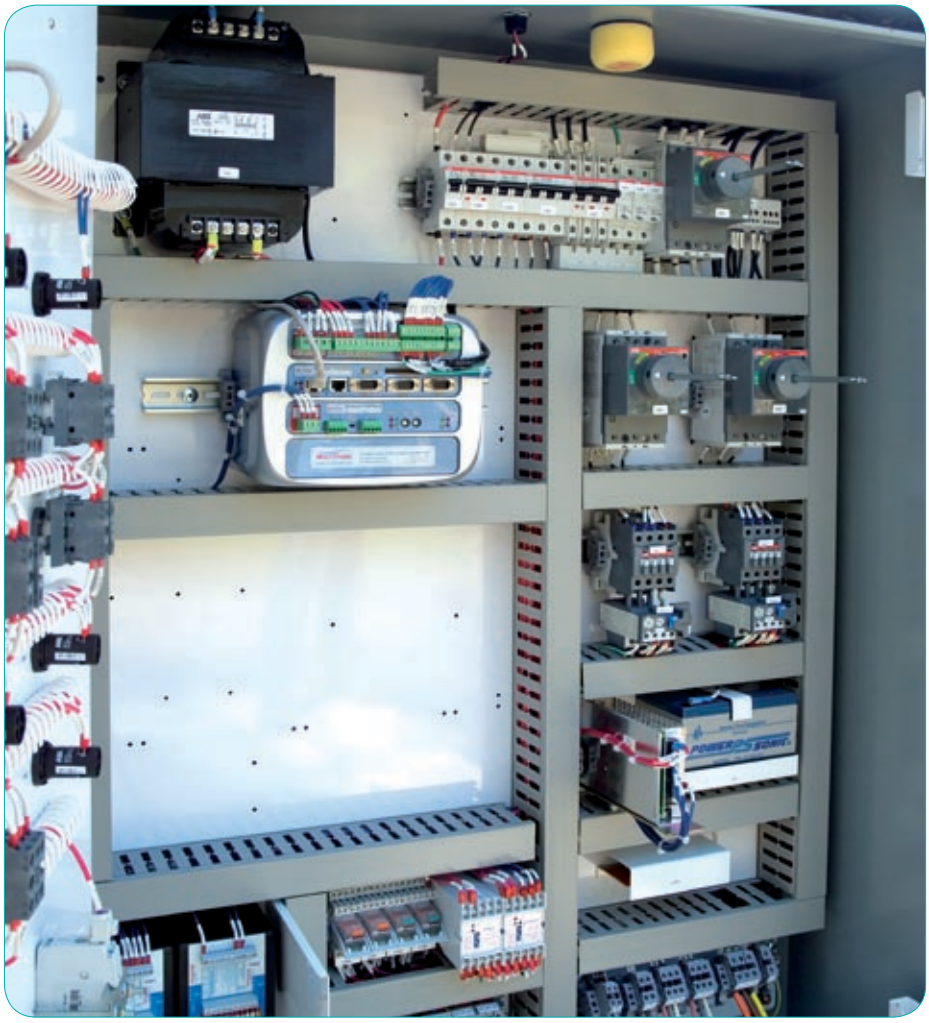
How easy was the installation?

During installation, no design modifications were required, the product was user friendly and easy to understand, and no setting or programming adjustments were needed. So operators required almost no technical or training support for the system.

According to Guest, "the installation was the easiest thing I ever did. I took the MultiSmart unit out of the box, wired it up, turned it on and it ran. The initial start-up screen came on, asked me four or five questions, and gave me a choice of options depending on how I wanted to use the equipment. All I had to do was select an answer and confirm. It was like taking a multiple choice test in school."

"In our old system, there was no way to know if there was a problem at the pump station without going to the site. Since there are multiple pumps at each station, any time there is a pump failure, one or more pumps may be affected. Some times one of the level-detecting devices will malfunction and won't accurately detect the level of waste water. That's when the potential for raw sewage to overflow becomes real."



With the MultiSmart controller, there are several fail-safe features built into the system. For instance, the controller has alarms and also pre-alarms, where an operator is notified prior to an alarm. The system isn't limited to only look at things that have failed. It's also able to pinpoint potential failures and other problems before they happen.

Said Guest, "Suppose the sewage level has risen far enough that a pre-alarm is tripped. Once the operator is alerted, he can log onto a system computer and check the station in question. It's not in alarm mode yet, but it's past the point that an operator would normally be comfortable if he were standing there watching the station."

Staff who control the pump stations are able to log into a station and take a critical look and see if a pump has failed to start, or a pump is starting too fast, or even if the sun is heating the inside of the control panel and causing a component to malfunction. Any of these conditions would prompt a pre-alarm signal. The MultiSmart controller not only sends a signal, it is capable of identifying the problem.

As part of the 5-year plan, EBRPD is preparing for SCADA to go on-line in the fall. With SCADA interfacing with MultiSmart controllers, a centralized network will be able to reset, troubleshoot and otherwise correct the majority of problems directly from either a remote location computer or a centralized computer. With SCADA, the operator can see what the problem is, what caused the problem, and decide to either reset it from the base computer or dispatch someone to the station for service. The dispatcher can tell that person exactly what they're going out there for, exactly what they're going to be doing, and exactly what they need to bring with them.

Cost Savings

EBRPD has pump control stations all over the 1700 square miles it covers, and sometimes it takes up to an hour and 20 minutes to reach a location.

Guest said, "The real cost saving is not in the purchase very costly. The EPA charges sewage violators millions of dollars in fines every year."

Communications

"When I started looking for pump controllers, three things came to mind… reliability, flexibility and adaptability," Guest explained. "It was a major leap to go from doing everything manually to communicating with equipment in my office. For me to be able to interact with the equipment and see what it's doing, have the station talk to me and send me regular reports was comparable to moving from the 19th century into the 21st century. The difference was that great. Once we went on-line with the new pump control system, significant cost-efficiency and cost saving were realized."

Performing predictive maintenance used to be a manual operation. Now tracking things like bearing and field life in station pumps is accomplished systemically, without estimations or calculations from the operator. The MultiSmart controllers are capable of accommodating up to four different software changes to the control panel by making simple software configuration changes with little more than a flash card.

In a parks and recreation district, flexibility in pump station control is an important issue. Sudden population shifts at the park may require a station to perform differently, or alarm criteria change to accommodate a critical upcoming event. In the past the pumps were either on or off, and the same applied to the alarms.

The new controllers also allow stations to communicate with each other. This is a very valuable feature. In cases where there are long distances to the sewer, there are often multiple stations connected serially. If one station fails, it can communicate to the stations behind it to stop pumping and become holding tanks to eliminate the risk of overflow.

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Battery Packs

MultiSmart controllers come with battery packs. The fact that the system can still function when there is a power outage is a cost-savings waiting to happen. Sometimes extreme heat from the sun will cause a circuit breaker to trip. When that happened with the old system, there was no way to tell. Consequently, people used to check stations two and three times a day. With the MultiSmart system, it not only works without power, it also signals when a circuit breaker is turned off. So service people know immediately and can fix it before a more serious problem develops.

Preventative Maintenance Controllers

A value-added feature of the controllers is their ability to protect pump motors from sporadic voltage sags and surges, or spikes on the utility line. If a pump is running during one of these events, it can harm the motor. Guest said, *"We can program the controller to monitor the incoming voltage. If the voltage deviates from what we consider safe, the pump will immediately stop running. It will only start-up again when the voltage stabilizes. Concurrently, the system will signal the event and continue to notify the operator of any further changes. By protecting the motors, the controllers are, in fact, performing a preventative maintenance function. Cost savings, perhaps…cost–efficiency, definitely."*

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