



**ENTERPRISE
AUTOMATION**
A TETRA TECH COMPANY

PROJECT PROFILE

Ignition SCADA upgrade

CARLSBAD MUNICIPAL WATER DISTRICT

Client background

The Carlsbad Municipal Water District (CMWD) is a subsidiary district of the City of Carlsbad. The City of Carlsbad operates wastewater facilities, including lift stations. CMWD supplies potable water and operates the city's drinking water and recycled water facilities for approximately 92,000 people within its service area. The district operates multiple treatment facilities, storage reservoirs, and an extensive pipeline network.

Project background

The Carlsbad Municipal Water District needed to refine and execute their existing master plan, which included plans to replace aging infrastructure and install a high-availability Ignition-based SCADA system that offered real-time control.

Increasing flexibility and standardization across their system would boost the existing capabilities of their staff by reducing their cognitive load and unlocking time to engage in more impactful endeavors. At the time, CMWD's SCADA system was only capable of monitoring operations. Without the ability to remotely control the wastewater lift stations or troubleshoot control panels, operators had to visit each site at least monthly to manually collect runtime and status data.

By selecting Enterprise Automation, the Carlsbad Municipal Water District could leverage EA's strategies for time and cost efficiency in both execution and future operations. As engineer of record for the control panels, EA was also tasked with developing control panel designs, technical specifications, and construction drawings, collaborating with other contractors.

Project Manager



**Clarence
Go**

Project Technical Lead



**Nick
Tostado**

Key Insights:

- Templatized approach to programming and screen building across 54 sites saved client \$250,000+
- Designed 55 panels, programmed 1,000+ IO, configured 35,000 tags

Key Technologies:

- Ignition SCADA
- Allen-Bradley CompactLogix L320-ER
- Studio 5000
- OnLogic TC401 OIT

EA Solutions

With this upgrade, water operators looked forward to having centralized management over their 50+ sites and increased reliability. These ends were primarily achieved through three major improvements: the installation of new PLCs and SCADA systems, the development of new networking and platform infrastructure, and the implementation of new control panels and wiring with increased standardization and documentation.

EA's engineers saved at least \$250,000 by using a template strategy to create PLC programs, HMI screens, and electrical panels across all sites. Through this method, they grouped sites with similar functions into templates, significantly reducing the time and labor costs of reworking, testing, and commissioning 54 individual sites. This approach also established a procedure to simplify future expansion.

The flexibility of Ignition's SCADA platform greatly aided the template approach. Ignition's embedded views enabled engineers to create dynamic screens that adapt to the site. For example, a single screen could show different pumps, generators, or tanks depending on the selected site by hiding or showing graphical objects. Engineers built a standardized interface that was consistent, thereby requiring minimal training to understand the screens from site to site.

Aside from its ease of configuration, CAWD chose Ignition primarily due to its cost flexibility and its ability to serve as an all-in-one software that could handle alarms, reporting, historian, and controls. Through the new platform, operators gained the ability to remotely monitor and control site equipment from iPads or computers. Operators were also relieved of the need to travel to site frequently to collect manual data. Previously, pump runtime had to be read manually on dials, but with PLC programming, the data collection became automated and trends were easy to track on screens. With this time given back to the operators, they had more bandwidth to optimize their facilities instead of having to frequently troubleshoot broken equipment or collect measurements. EA also spent time creating documentation and training materials based on insight from the most experienced staff so future operators could get up to speed without needing to rely on these individuals to cover the gaps in institutional knowledge.

Supporting this system was the new networking and platform infrastructure, which was built in a collaborative process to comply with the project budget. EA designed the networking and platform infrastructure, and the Carlsbad IT department implemented it, using their own best practices. As part of the validation process, engineers created a detailed simulation environment replicating site conditions and tested control strategies. They built a test bench at CMWD's office, replicating a remote site with the same architecture, communications, and Ignition system to prove the concept before field commissioning.

With these improvements, the Carlsbad Municipal Water District benefitted from increased maintainability, stability, and flexibility. The system standardization made training operators easier and documented the knowledge of the most experienced staff, providing a safety net in case of personnel changes.

Equipped with a stable SCADA system, Carlsbad can continue to implement more sophisticated control strategies and integrate with other city databases, such as GIS.

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