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Let's Solve Water

Case study

# Automated Pumping of Constructed Canal Based on Water Quality

PELICAN WATERS, SUNSHINE COAST

Over the years, Australian's desire to live on or near water has seen thousands of constructed water bodies built as part of exclusive housing developments. In the past, developers simply excavated the land, built up the blocks, flooded the canal and move on to the next project.

This effective but primitive approach lacked appropriate hydraulic modelling to protect the water body and maintain its health and safety over time. With changing seasons, siltation and nutrients from storm run-off along with an overall lack of flow, these water bodies tend to become prone to toxic algae outbreaks, fish kills and offensive odour, among other things.
Local government frequently inherit such sites, and in many cases the excessive and permanent costs of their effective management.

Figure 1 - typical coastal constructed water body development.

**Project**
A coastal council located in Queensland, Australia, manages several existing constructed water bodies and sustains their health by pumping 'fresh' seawater from the main tidal broad water with Xylem manufactured Flygt pumps. The newly pumped water provides much needed movement and transfer in the otherwise static canal.

This method, although functional, requires manual start/stop of the pumps which then run for a set period (12 hours). To date, water quality sampling on the canal was performed weekly at a few predetermined locations, providing quite course spatial data with respect to how the pumped water was being dispersed and the overall effectiveness it had on the water body.

As the council looked to find efficiencies in their operation via the smart cities initiative, Xylem was approached to propose a technology based solution.

Figure 2 - Real-time water quality monitoring buoy (YSI DB600)

"By measuring water quality at both the intake and outfall the system can determine on its own when pumping is required and for how long – this has provided enormous operational savings"

YSI
a xylem brand

**Solution Overview**

The technology-based solution consisted of three solar powered YSI EXO3 multi parameter sondes stations providing real-time water quality data enabling full automation of the pumping schedule. All data is displayed in real-time via Eagleio cloud data platform.

**System Logic:**

1. The system begins measuring water quality using the YSI EXO3 multi parameter sonde at the broad water intake to determine if the water is within acceptable range to pump? It is not uncommon during high rain events for the broad water to run fresh - in this instance, pumping fresh low salinity water into the canal would defeat the purpose and simply waste electricity running the pumps

2. If the broad water measurement was within the pre-determined set point the system would then take measurements from two EXO3's located in the canal. 1) Canal out fall via DB600 Buoy 2) Canal boat lock weir. The water quality (salinity) is then referenced against user defined set points.

3. Using basic system logic, data from all three locations is analysed every 30 mins to determine if pumping is required.

4. Once conditions are met to pump, the system checks if power is on or off peak? If the power is on peak the system will delay the automated pump start up.

5. Once pumping begins, the system continuously samples all three locations to monitor progress. Once acceptable results are measured at the boat lock weir site the pumps are automatically stopped.

6. At all times the council can view real-time data, track the system status, set up SMS/email alarms/notifications & remotely start/ stop the pumps remotely via Eagleio.

**Summary:**

This small yet powerful end to end solution provided by Xylem demonstrates the effectiveness of adopting a technology-based approach focusing on improving and refining operations.


Figure 3 - YSI EXO3 Multi Parameter WQ Sonde.

Figure 4 - Eagleio Cloud Web/View/Alarm Platform.

End user: Coastal Council
Client: Coastal Council
Order date: 2018
Completion: 2019
Xylem's role: Principal
Xylem scope:
Design, manufacture, installation and commissioning of the real-time automated water quality pumping system for Pelican Waters, Sunshine Coast.

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