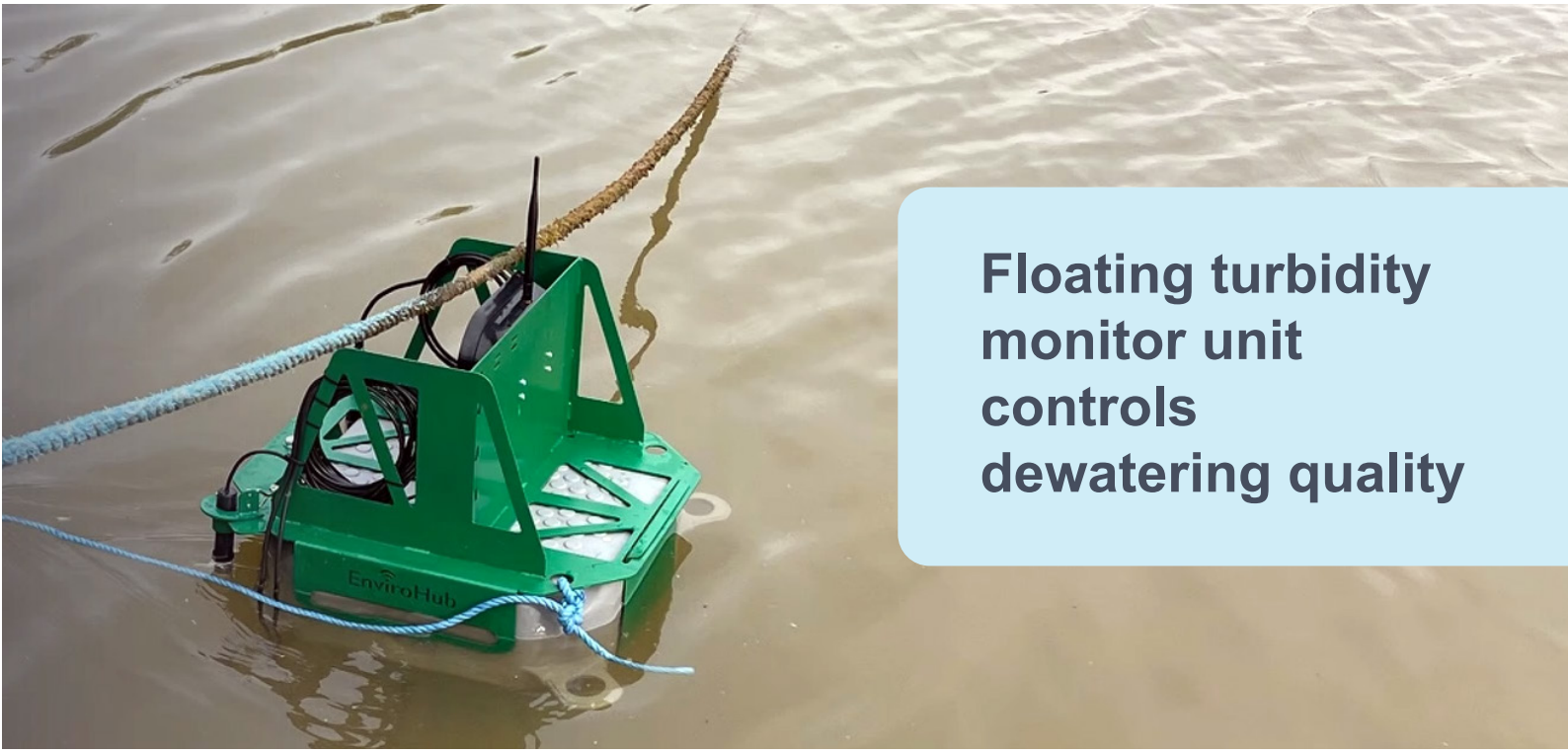

Floating turbidity monitor unit controls dewatering quality

Lagoon dewatering at a sand and gravel quarry

Overview

Upgraded turbidity monitoring sees floating sensors provide real-time data for improved process control. 3-phase pump replaced by low-powered, battery-enabled monitoring system.

Problem

Monitoring water quality in dewatering operations is essential to remaining compliant with environmental protection law, and discharge licenses/permits.

Many dewatering systems are fitted with sensors that stop pumping operations when out-of-spec water is detected. However, dealing with the quality issue and knowing when discharges can start again often involves manual intervention. With basic systems, there's also the risk that a small quantity of contaminated water could escape before the trigger takes effect.

Stopping the dewatering pump is the easier part, but dealing with the in-pipe dirty water and automating the restart is more challenging.

In the case of this sand quarry, it was turbidity that was of concern. The first control system installed was based on forecasted settlement time; after a pre-set time delay to allow for gravity settlement in the lagoon, the dewatering cycle reset and the pump restarted. If settlement was taking longer, the system would perform another shutdown.

> Automated site dewatering - Assured water clarity - System uptime and resilience.

The main problem with this arrangement was that the pre-set time delay rarely matched the settlement rate. With at least three variables involved – weather, site activity, and silt composition, the ideal settlement time was difficult to attain.

An earlier improvement to the dewatering system saw the addition of a sampling loop which consisted of an Audex submersible pump, an EnviroHub Monitoring Unit (MU) and Control Module (CM), which fed into the control panel for the main dewatering pumps. This meant the dewatering pump would stop as soon as a quality deviation was detected, and re-sampling of the water allowed an automated restart when conditions allowed.

Although this 2nd generation system was a definite improvement, the pump model that ran the sampling loop 24/7 wasn't designed for such continual operation. It worked, but we knew it wouldn't last forever and that a more effective method could be designed.

Moreover, power requirements were often a site-wide issue as the remote quarry was affected by frequent power outages, resulting in dewatering downtime and gaps in data visibility.

Solution

Negating the need of a sampling pump would remove a potential point of breakdown and complexity, and reduce energy use.

The solution Atlantic Pumps developed was to put the turbidity probes into the lagoon itself which would give much faster response time and more accurate control. However, its electronics and antenna (it stores real-time data on the cloud) couldn't be at risk of submersion.

It wasn't something we had field-tested before, but this client was happy for us to trial a floating sensor module. The Floating Monitoring Unit, developed by Atlantic Pumps R&D team, keeps the unit's electrics dry, with the probes located near the inlet for tighter dewatering control. Following the trial's success, this floating MU is now part of the official EnviroHub lineup, and available to any site with similar requirements.

Result

With the probes in the optimum place, dewatering stops before silt levels encroach on the pipe inlet. This means zero contaminated water is drawn into the pipe, and operations can start again as soon as the water clarity at the inlet level returns to quality specifications.

Removing the need for a continually running recirculation pump has drastically cut energy consumption, while reducing maintenance and wear costs.

The lower power draw has enabled a resilient battery backup allowing dewatering whenever required, with full uptime and 24/7 availability of environmental performance data.

Keeping maximum discharge per 24 hours is automatically controlled by the link between the EnviroHub CM and Senteos.

Product Details (Tech)

- EnviroHub Floating Monitoring Unit (Floating MU)
- EnviroHub Control Module (CM)
- Control panel and battery backup
- Senteos online data capture

ATLANTIC PUMPS

Get In Touch...

T: +44(0)1246 284 420 **E:** hello@atlantic-pumps.com **W:** atlanticpumps.co.uk

Atlantic Pumps Ltd is registered in England company number: 09400148. VAT Number: 249459267.
Registered Office: Atlantic Pumps, Carrwood Road, Chesterfield, Derbyshire, United Kingdom, S41 9QB.