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Case study

Redefining responsiveness in the water industry

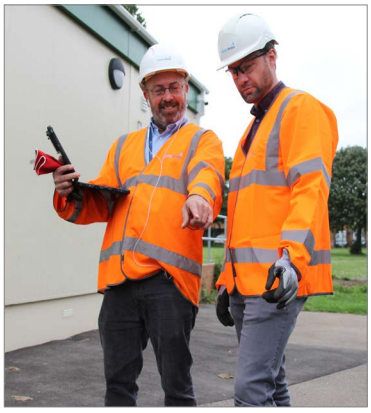
Affinity Water

The Challenge

- Reduce leakage by a further 20% by 2025 after beating the 2015 – 2020 leakage reduction target

The Benefits

- Faster responses to emergency water outages
- Rapid and effective measures to reduce leaks
- More efficient business operations
- Improved customer measure of experience



After achieving its industry-leading target for water leakage reduction, Affinity Water has committed to further reductions in the next five years. It now uses Esri's ArcGIS platform, together with open source technologies, artificial intelligence, machine-based learning and a whole lot of ingenuity, to help it respond faster than ever before to water supply interuptions and leaks.

The Challenge

In July 2020, Affinity Water announced that it had achieved the most challenging five-year leakage reduction target of any water company in England and Wales and reduced leakage by 15%. Not content to stop here, it then launched an ambitious new five-year plan including targets to reduce supply interruptions by 17% and cut leakage by a further 20% by 2025. Meeting this target matters not only for ensuring future generations can continue to enjoy a reliable water supply. It is also a core part of the company's mission to protect the local environment where water is drawn from.

To enable it to meet its key performance commitments, Affinity Water is on a path of continuous business improvement. It is investing in the latest technology to help it find and fix leaks faster than before and respond more quickly to water supply interruptions

The Solution

Affinity Water created a browser-based application, using the ArcGIS JavaScript API and open source technology, that knits together data from legacy systems, including customer relationship management and vehicle tracking solutions, and makes it visible on interactive maps. Critically, the solution also incorporates live feeds from nearly 4,000 water flow and pressure loggers installed on the network, as well as 20,000 acoustic loggers that 'listen' for sounds that might indicate leaks. "ArcGIS pins all of our subsidiary systems together and gives us a geographical representation of our business information," says James Tyreman, Head of IT Development at Affinity Water.

Known by Affinity Water as the Situational Awareness solution, this transformational system is used 24/7 by the organisation's network control team on desktop and laptop computers and by engineers in the field on tablets. If there is a water pressure alert or a customer call, the ArcGIS map at the centre of the solution automatically zooms into the location of the issue. Employees can then click on the map to access data from other integrated systems, such as work orders for managing repairs and street plans for arranging road closures, all from the interactive ArcGIS web map. It is what Tyreman describes as "a single pane of glass" providing clear visibility into all aspects of the Affinity Water network at that precise moment in time.

Affinity Water also uses ArcGIS in combination with machine learning, artificial intelligence and its loggers to help it identify the most likely locations of leaks and bursts with a greater degree of accuracy. Rather than just relying on alerts from its loggers, it uses machine learning and artificial intelligence to analyse geospatial factors such as the directional flow of water, the location of the pipes, the contour of the ground, the soil type and the surface structure, to 'learn' with greater accuracy the most probable locations of a leak.

Both the Situational Awareness solution and the new GIS-embedded technique for modelling leaks were developed in-house by Affinity Water in a series of continuous improvement cycles using thorough documentation provided by Esri. "The power of ArcGIS is that developers can just run with it and create these amazing tools," Tyreman says.

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> We anticipate that our Situational Awareness solution will help us to reduce the average time that properties are without water and support us in achieving our Ofwat performance target for 2020-25.

Sue Fenlon, Head of Control Operations, Affinity Water

Affinity Water's Situational Awareness solution shows an active incident with indicators including customer contact, jobs, logger locations and the pressure graph for the District Metred Area

The Benefits

Faster responses to emergency water outages

The new ArcGIS-based Situational Awareness solution is helping Affinity Water to respond more quickly to water supply interruptions. Employees have instant visibility of all incidents, on an interactive map, as soon as they occur and can easily access all the information they need to plan the best response, all from one screen, which will enable the organisation to restore water services more quickly. "We anticipate that our Situational Awareness solution will help us to reduce the average time that properties are without water and support us in achieving our Ofwat performance target for 2020-25," says Sue Fenlon, Head of Control Operations at Affinity Water.

Rapid and effective measures to reduce leaks

By using geospatial analysis in conjunction with artificial intelligence and machine-based learning for the first time, Affinity Water can now more accurately and more quickly identify the most likely locations of leaks within District Metred Areas (DMAs). Indeed, the organisation estimates that it has reduced the amount of time required to narrow down the search for a leak from around two weeks to one day. This time saving will help Affinity Water to operate more cost efficiently, fix leaks more promptly, reduce water loss and deliver on its commitments to reduce leakage further.

More efficient business operations

Through its combined use of both the two new ArcGIS-powered solutions, Affinity Water expects to make significant, sustainable operational efficiencies. For example, engineers can use their tablets in the field to see live pressure changes on sensors without having to call head office or perform time-consuming manual checks. In the network control team, employees can access all the information they need to plan a road closure from within the ArcGIS map, without having to access multiple different systems. Asset teams can also use the Situational Awareness tool to look back at the history of a section of network and gain insight to inform maintenance programmes.

Improved customer measure of experience

Although it is still early days, Affinity Water anticipates that its new Situational Awareness solution will help it to improve its customer satisfaction over time and, in particular, help it to achieve a positive ranking in the Ofwat Customer Measure of Experience (C-MeX). As Tyreman explains: "Our ArcGIS-based Situational Awareness solution gives us early visibility of issues, so that when customers ring, we can say exactly what we are already doing to resolve the problem and can give our customers added confidence in our ability to restore their services quickly."

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