

Photo: Severn Trent Water

Stand and deliver!

To maintain water quality and continuity of supply, Severn Trent Water is cracking down on illegal standpipes with a campaign backed by a fast track mobile GIS data collection exercise

It's hard to imagine water theft as a major problem for water providers. After all, the amount taken is small compared to that lost through network leakages. Even so, those installing unauthorised standpipes or illegally abstracting water from metered supplies can cause considerable physical damage and/or contamination. Remedying the consequences can prove costly, with the inevitable disruption to service and loss of revenue.

While policing such activity is difficult, Severn Trent Water (STW) has not been slow in taking enforcement action, with some 50 investigations leading to formal cautions or criminal prosecutions this year alone. As STW project officer Jessica McKay explains, the illegal fitting of standpipes to fire hydrants is a particular concern. "Quite apart from causing physical damage, this type of tampering can alter the pressure in the mains and dislodge sediment that discolours the water. It puts hydrants out of commission, causes inconvenience to consumers, and poses a problem for fire and rescue services."

If the cap fits ...

With water mains that stretch for 46,000km and serve 4.3 million homes and businesses, catching the culprits is a daunting task. In its latest move to deter those responsible, Severn Trent has been fitting specially-designed locking caps to its inventory of 300,000 hydrants spread across eight counties. "The idea was put forward in the summer of 2015, following which we performed a cost-benefit analysis based on trial of fitting 40,000 such caps to hydrants in Derbyshire. Although factors such as reputational damage stemming from consumer complaints are difficult to quantify, the benefits were clear nevertheless" says McKay.

The next step entailed an ArcGIS Desktop exercise in which information drawn from a corporate database was used to identify and map hydrants most at risk of tampering, with new fields and symbology created for the purpose. A simplified version of the

resulting data was published as a web map in ArcGIS Online, Esri's cloud-based GIS, for deployment to a newly-developed mobile app, Hydrant Caps. Developed by Laura Boagey, STW's senior GIS technician, it runs Esri's Collector for ArcGIS app on smartphones and tablets and is used for real-time reporting by field engineers fitting the caps. Online updates are fed back into the master ArcGIS map and progress is monitored via an Operations Dashboard.

Fast track exercise

Aided by this technology, the task of visiting and fitting 40,000 hydrant caps across Derbyshire was accomplished by a 30-strong field team in just eight weeks. That it was conducted in bad weather over the Christmas period makes it an even more notable achievement. For McKay, the ease-of-use of the mobile app was a critical factor. "Engineers were up-and-running with the app after a five or ten minute presentation and it proved brilliant in use. Without it, we would probably still be gathering and collating data."

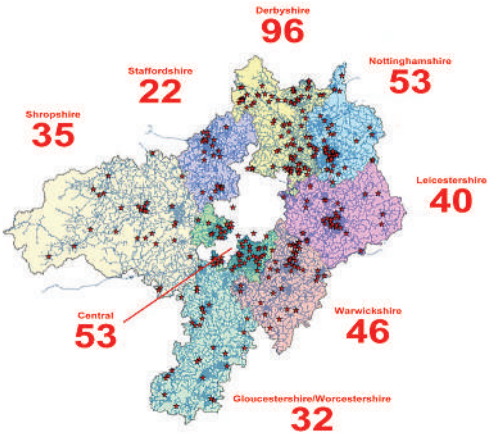
The outcome of the trial has proven its perceived benefits, not least in terms of consumer complaints which have fallen from seven or eight a week to just one every fortnight. It's a good example of how GIS is helping STW transform its business ... and one can be sure it won't be the last.



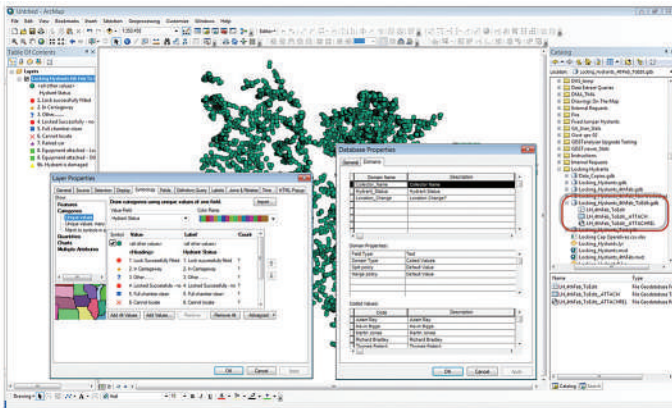
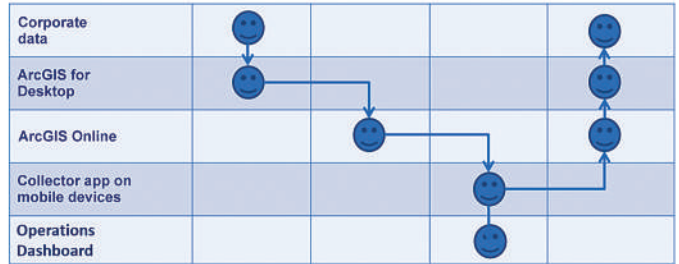
Laura Boagey (left) and Jessica McKay with the locking hydrant cap



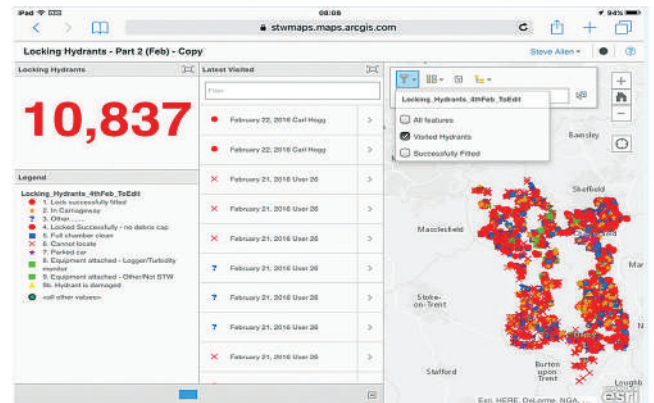
Hydrant Caps



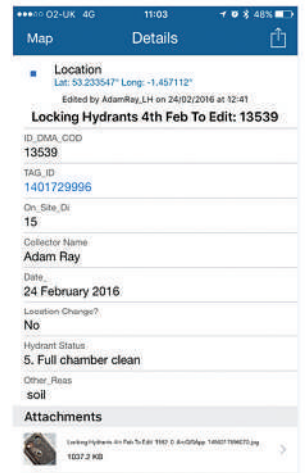
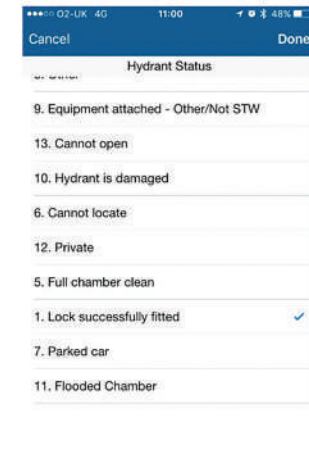
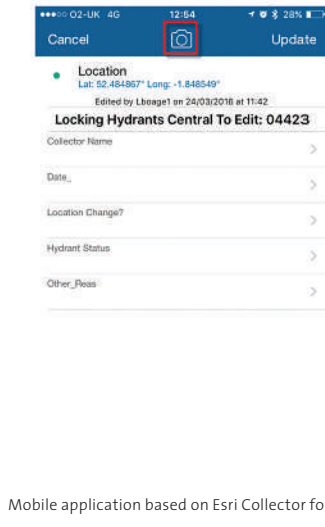
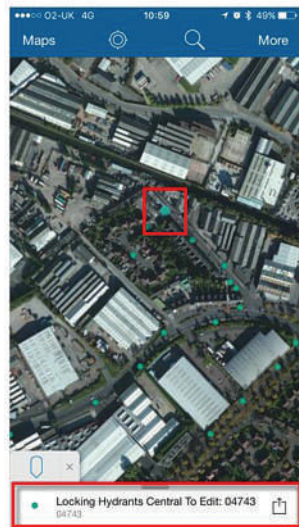
Discolouration Notifications recorded over a 12-month period preceding the Hydrant Caps project. These have since been cut dramatically.



Data preparation was performed in ArcGIS for Desktop



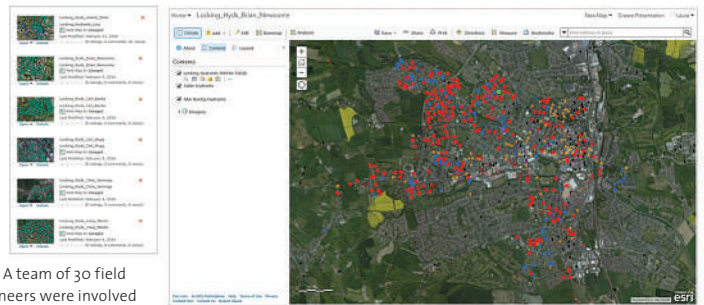
Operations Dashboard created to track fieldwork progress in real-time



Mobile application based on Esri Collector for ArcGIS runs on tablets and smartphones



Left: A team of 30 field engineers were involved in the trial which entailed visiting 40,000 hydrants and fitting locking hydrant caps (pictured inset) as and where needed



Right: New symbology was used to record site visits across Derbyshire over an eight-week period