

Satellite Leak Detection finds 902 leaks across 9,000km Affinity Water Case Study

Working with SUEZ and ASTERRA, Affinity Water used L-band SAR satellite intelligence to focus field crews on less than 4% of the network, recover 1.26 billion litres of treated water annually, and deliver £2.06M in programme value during AMP8.

902

LEAKS IDENTIFIED

763

LOCATIONS DELIVERED

1.26Bn L

WATER RECOVERED ANNUALLY

454%

INCREASE IN CREW EFFICIENCY

£2.06M

PROGRAMME ROI

“ Using satellite detection technology has become a regular addition to Affinity Water efforts to reduce leakage. The technology is unique in its approach to detection and offers targeted large scale surveys meaning we can cover significant parts of our network in a very short space of time compared to other techniques or technologies.

Over the years of using the system we have seen the results improve from each survey improve and more leaks found. This works really well for us at Affinity to survey areas that would otherwise be below the economic level to survey or locating leaks in difficult to access parts of our network. ”

Richard Kiernan, Leakage Analysis and Commercial Logging Manager at Affinity Water

In 2025, Affinity Water partnered with SUEZ and ASTERRA to deploy satellite-based leak detection across five survey areas.

Covering 9,045 km of distribution network, the programme was designed to help focus field investigation on the locations most likely to reveal hidden leaks.



Saved: 1.26 billion litres of treated water annually

Client Issue

For Affinity Water, meeting AMP8 leakage reduction commitments required more than finding visible or easily reported leaks.

A significant share of distribution network losses are non-visible and non-surfacing, with moisture anomalies present at pipe depth long before any evidence appears above ground. By the time a leak produces visible symptoms, such as vegetation change or pavement deterioration, it may already have been losing treated water for days or weeks.

Traditional acoustic detection is vital for confirming and locating leaks, but without prioritisation it can be difficult to scale, with crews spending time in low-probability areas while losses persist elsewhere.

Affinity Water needed an evidence-led way to prioritise field intervention across the Misbourne, Colne, Pinn, Brett, and Dour survey areas, helping crews focus on the parts of the network most likely to contain leaks before those losses escalated.

Solution

Affinity Water, SUEZ, and ASTERRA implemented ASTERRA Recover across five survey areas, using L-band SAR satellite intelligence to screen 9,045 km of Affinity Water's distribution network.

Rather than relying on surface indicators, ASTERRA Recover detects subsurface soil moisture anomalies at pipe depth, helping identify locations where buried pipe leakage is likely to be present. These georeferenced locations were delivered to field crews as a prioritised work list, allowing teams to focus investigation effort on targeted sections instead of walking the full network.

Across five data releases in September and October 2025, ASTERRA delivered 763 likely leak locations. Field crews used acoustic equipment to verify and locate the flagged leaks.

Implementation

The programme followed a structured workflow from survey planning through field validation and repair handoff:

- **Programme scoping:** Affinity Water, SUEZ, and ASTERRA defined the five survey areas
- **Satellite acquisition:** Captured L-band SAR imagery across the target areas
- **Data processing:** ASTERRA's algorithms analysed the imagery to identify subsurface moisture anomalies associated with likely pipe leakage
- **Location delivery:** 763 identified locations were issued across five data releases in September and October 2025
- **Field investigation:** Crews investigated flagged sections, confirming leak findings and classification data
- **Reporting:** Results were collated in EO Discover, and report issued in May 2026

- **Repair handoff:** Confirmed leaks were passed into Affinity Water's repair programme.

Results

The programme demonstrated the value of prioritised leak targeting: teams found 902 leaks across five survey areas while inspecting less than 4% of the 9,045 km network scanned.

ASTERRA delivered 763 identified locations, of which 546 were investigated, representing a 72% investigation rate. Of those confirmed, 59% were non-surfacing, reinforcing the value of detecting subsurface moisture anomalies before visible indicators appear.

Field crew productivity reached **7.2 leaks found per crew day**, compared with an industry benchmark of 1.3, a 454% improvement. Leak detection density reached 3.2 leaks per km inside flagged areas, compared with 0.3 leaks per km industry-wide, a 967% improvement.

The programme **recovered 1.26 billion litres of treated water annually**, equal to 3.45 ML/day of leakage reduction or approximately 504 Olympic-sized swimming pools. This represented £1.9m in water cost savings. Reduced pumping and treatment also saved 755,725 kWh of energy, equivalent to £107k, and reduced greenhouse gas emissions by 536.6 MT CO₂. The **combined water and energy savings delivered £2.06M in ROI**.

Saved: 1.26 billion litres of treated water annually

How it works

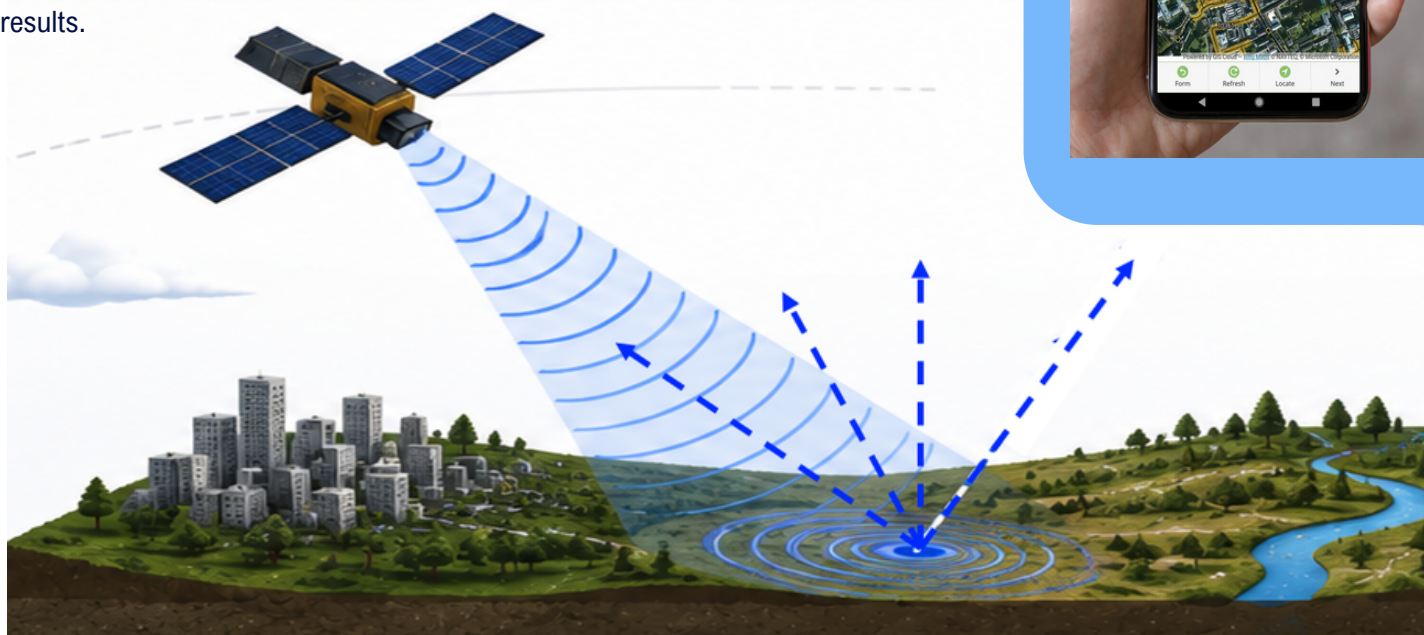
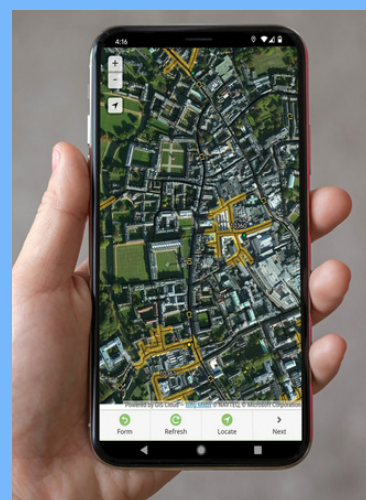
ASTERRA Recover uses L-band Synthetic Aperture Radar, a radar wavelength capable of penetrating 3-5 metres of soil, to detect changes in subsurface moisture at pipe depth. When a buried pipe leaks, water moves into the surrounding soil and changes its dielectric properties. L-band SAR sensors can detect these signatures directly, rather than relying on surface indicators such as vegetation stress, ground subsidence, pavement deterioration, or visible surface moisture.

This distinction is operationally important. Surface indicators can take time to appear and may be influenced by rainfall, irrigation, groundwater variation, soil type, or saturated conditions. By detecting the moisture anomaly closer to the source, ASTERRA helps utilities identify likely leaks earlier and prioritise acoustic confirmation where it is most likely to produce results.

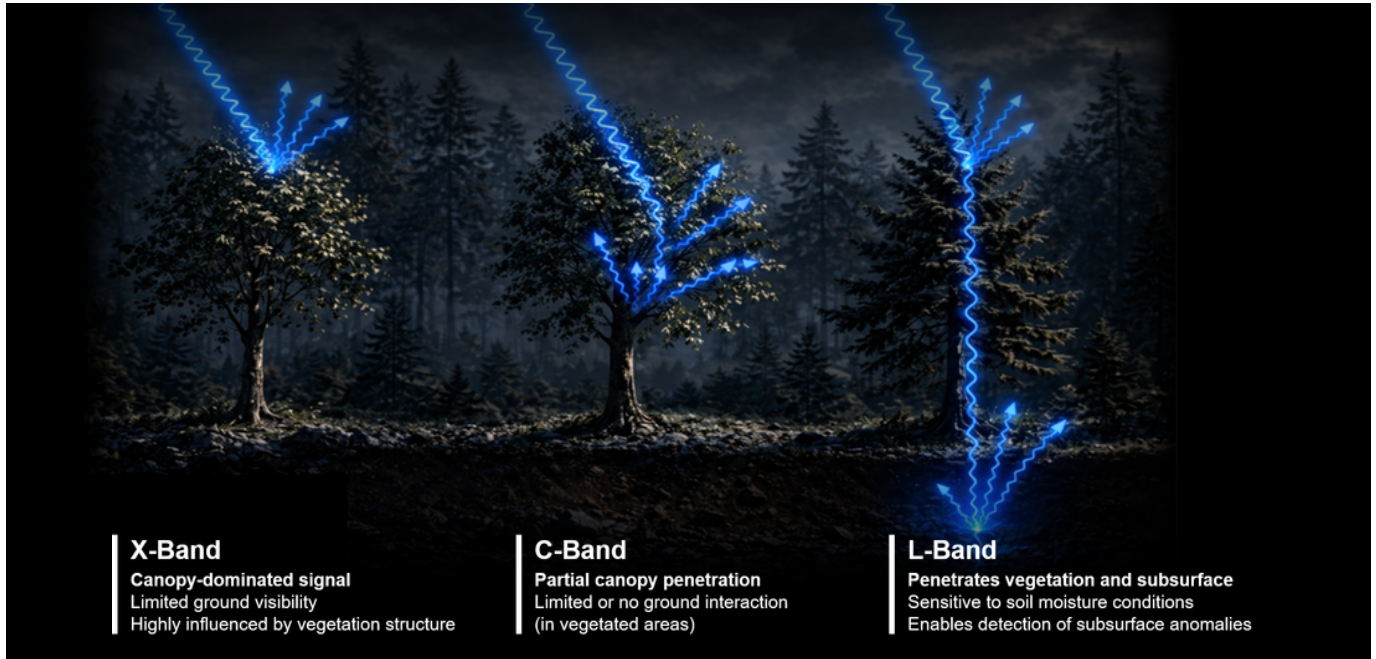
The output is a set of georeferenced likely leak locations delivered digitally to field teams. Crews then use conventional acoustic equipment to confirm and pinpoint leaks within the flagged areas. In this way, the satellite layer acts as a network-scale prioritization tool, focusing skilled field resources on the highest-probability locations.

Differentiating factors

- **Targeted field deployment:** Crews worked from a prioritised list of likely leak locations instead of walking the full network, helping them identify 902 leaks while covering less than 4% of the scanned network.
- **Direct subsurface detection:** L-band SAR detects moisture anomalies at pipe depth, helping identify non-surfacing leaks before visible surface evidence appears.
- **Network-scale screening:** The programme screened 9,045 km across five survey areas in a single programme cycle, giving Affinity Water a scalable way to prioritize field activity.
- **Operational efficiency:** Productivity reached 7.2 leaks per crew day, compared with an industry benchmark of 1.3, showing the impact of concentrating crews on higher-probability locations.
- **Measurable programme value:** The programme delivered 1.26 billion litres of annual water recovery, reduced energy usage, lowered CO₂ emissions, and produced £2.06M in combined water and energy savings.



Saved: 1.26 billion litres of treated water annually



The Future

The Affinity Water programme shows how satellite-enabled leak detection can be operationalised at scale within an existing field investigation framework.

Future programme cycles may extend coverage to additional survey areas and incorporate repeated satellite passes to monitor network response following repair activity. As results continue to be viewed and managed through ASTERRA's EO Discover platform, Affinity Water can build a more connected workflow between satellite intelligence, field investigation, performance reporting, and asset management.

About Affinity Water

Affinity Water is the largest water-only supplier in the UK, serving approximately 3.7 million customers across the Home Counties and parts of the Thames Valley.

The company is regulated by Ofwat under the Water Industry Act and operates under PR24 performance commitments for the AMP8 period 2025–2030.

About SUEZ

Faced with growing environmental challenges, SUEZ has been delivering essential services that protect and improve our quality of life for more than 160 years.

SUEZ provides its customers with innovative and resilient solutions for water and waste services.

With 40,000 employees across 40 countries, the Group works with customers to create value over the full lifecycle of their assets and services, and to drive their low carbon transition.

In 2025, SUEZ provided drinking water for 67 million people worldwide and sanitation services for more than 36 million people. The Group generated 8.7 TWh of energy from waste and wastewater. In 2025, SUEZ generated revenues of 9.5 billion euros.