

# SMART DETECTION FOR HIDDEN PROBLEMS

Josh Wilce, regional director for water and environment at Waterman Aspen, discusses AI and the future of infiltration monitoring in drainage infrastructure, raising the prospect of a new solution from Japan



As extreme weather events become more frequent and more homes are built, the pressures on the UK's drainage infrastructure continue to mount.

Early indications from the 2025-2030 Asset Management Period 8 (AMP8), the eighth five-year regulatory cycle for the UK water industry, suggest UK water companies have a key focus on reducing combined sewer overflow (CSO) spills to a level deemed 'acceptable' by the Department for Environment Food and Rural Affairs (DEFRA).

## Tackling AMP8 challenges with innovation

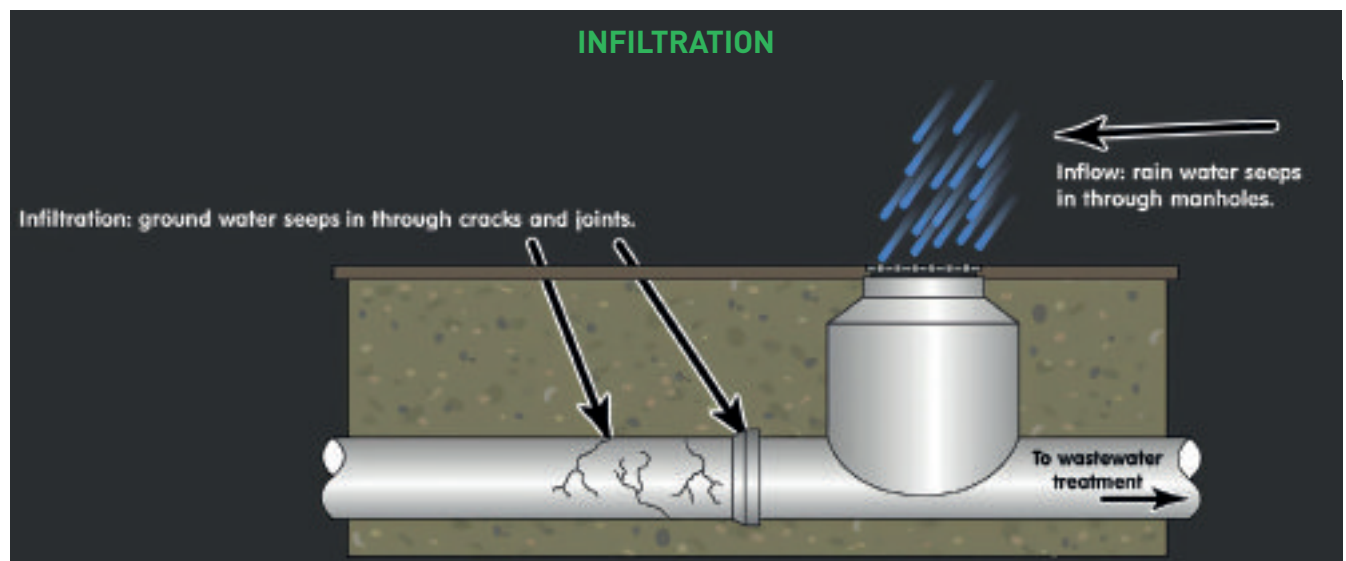
Among the lesser-seen and often deemed 'too hard to address' challenges is the problem of infiltration — the ingress of groundwater into the sewer network. Typically hidden underground, this phenomenon is a silent disruptor, reducing pipe capacity and contributing significantly to issues within treatment and pumping station operations. It is a contributor to the CSO spills

and so ultimately can lead to raw sewage entering our rivers and waterways. Infiltration can account for up to 40% of the domestic flow in some networks, according to Ofwat.

Waterman Aspen is introducing a new AI-powered infiltration detection tool to the UK, in collaboration with Waterman's parent company CTI Engineering in Japan. The technology was originally developed to monitor Japan's earthquake-prone sewer networks.

Traditional detection methods use flow loggers, which require installation at the base of manholes — an approach that can be time-consuming, more expensive, and not without risk due to confined space entry and exposure to gases in a volatile environment.

In contrast, CTI Engineering has developed a method of assessing flow through pipework using acoustic sensing and AI analysis. The technology relies on AI acoustic sensing. A logger that is suspended from the top of a manhole collects sound data (*see picture*



above - copyright Waterman Aspen), which is analysed by AI systems using over 200 input data sets to detect anomalies caused by infiltration. The AI identifies baseline flow patterns during dry and wet weather events building a profile of typical flow characteristics.

By recognising deviations in the baselines, the AI flags sections of the pipe network where water may be infiltrating through cracks or faults.

This method not only eliminates the need for human entry into manholes for the data collection aspect but also allows a site team to install more loggers per day, reducing the costs of on site teams, disruptive road closures and traffic management. The AI technology also reduces analysis time.

### LLFAs and highways authorities

This innovation highlights a broader systemic issue: the need for joined-up infrastructure governance. Infiltration doesn't respect administrative boundaries — it affects highways drainage, wastewater systems, and local flood authorities (LLFAs) alike. Combined sewers are common across the UK, meaning that infiltration from highways and surface water systems impacts downstream sewage capacity, leading to wider environmental and societal costs.

A smarter detection method could aid LLFAs and highways authorities in their statutory duties and support strategic drainage planning, offering a collaborative pathway to meet AMP8 objectives.

By improving detection accuracy, the AI-powered system allows engineers to focus resources on known problem areas. This targeted maintenance means less road disruption, fewer emergency CSO spills, and better protection of watercourses during heavy rainfall events. Better data means better decision-making — something regulators and water companies increasingly demand.

AMP8 doesn't just challenge the industry technologically — it tests its people power. A growing skills shortage has left a gap in key areas including data analysis and system design. AI tools can amplify capacity, enabling fewer specialists to do more.

### Real-world applications

In Japan, the system has been deployed across 200+ sites, with government endorsement and successful outcomes. A case study in Kobe, covering 85 hectares with 32 sensors, demonstrated how quickly and accurately infiltration points could be pinpointed.

In the UK, Waterman Aspen and CTI are seeking trial sites through partnerships. Early interest has come from the Spring Innovation process, which has led to ongoing discussions with a number of UK water companies to initiate a UK-based trial.

The goal is a side-by-side comparison of AI analysis versus traditional loggers on a known infiltration network.

Following feedback from initial conversations, the team also secured ATEX certification for UK safety standards, ensuring the equipment is compliant with explosive atmospheres — a necessary step for its use in sewer environments.

If you are a drainage authority, water company, or infrastructure partner interested in trialling this tool, please contact Josh Wilce via Waterman Aspen for more information.

Free trials are being offered to interested partners. ●



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