

**Braithwaite**

# **Infiltration Reduction Plan**

**Last Updated: November 2024**



## Executive summary

Braithwaite Pumping Station Storm Overflow in Cumbria is currently in the survey stage (see Figure one) to address infiltration and reduce spills at the Braithwaite Pumping Station Storm Overflow (ALL0056SO). A desktop assessment concluded that groundwater infiltration is possible but slow response run off is a more likely contributor to spills in the area. Braithwaite Pumping Station Storm Overflow. Surveys are underway to clarify this as well as the exploration of Natural Flood Management to manage rural run off if this is found to be a significant contributing factor in spill numbers.

If groundwater infiltration is found to be a leading cause of spills, interventions will be assessed and this Infiltration Reduction Plan will be updated accordingly. If not, this plan will end at the survey stage and next steps will be processed through other relevant workstreams.

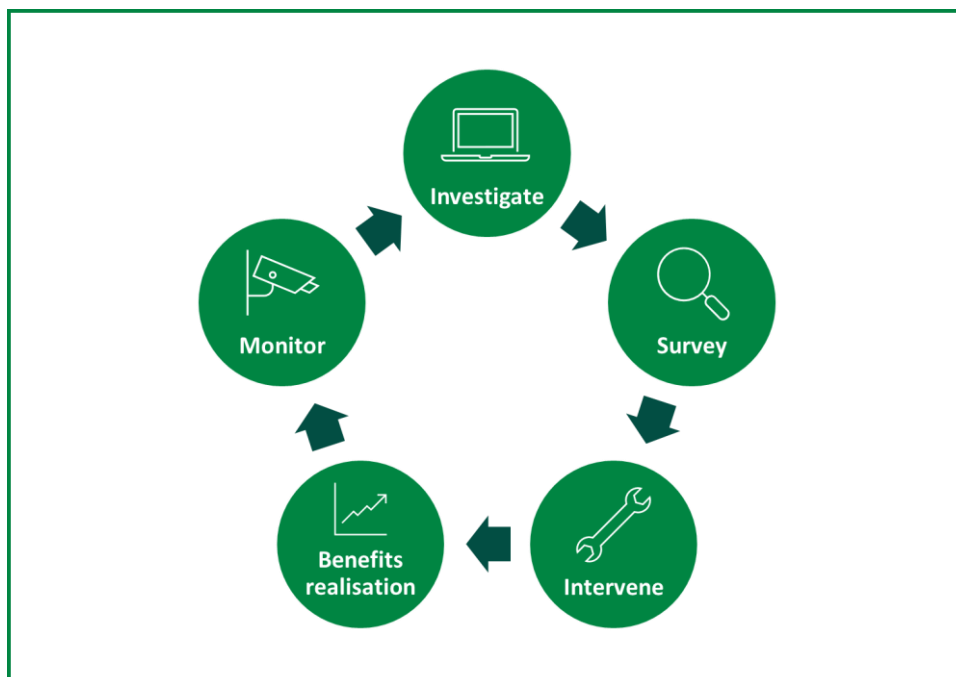
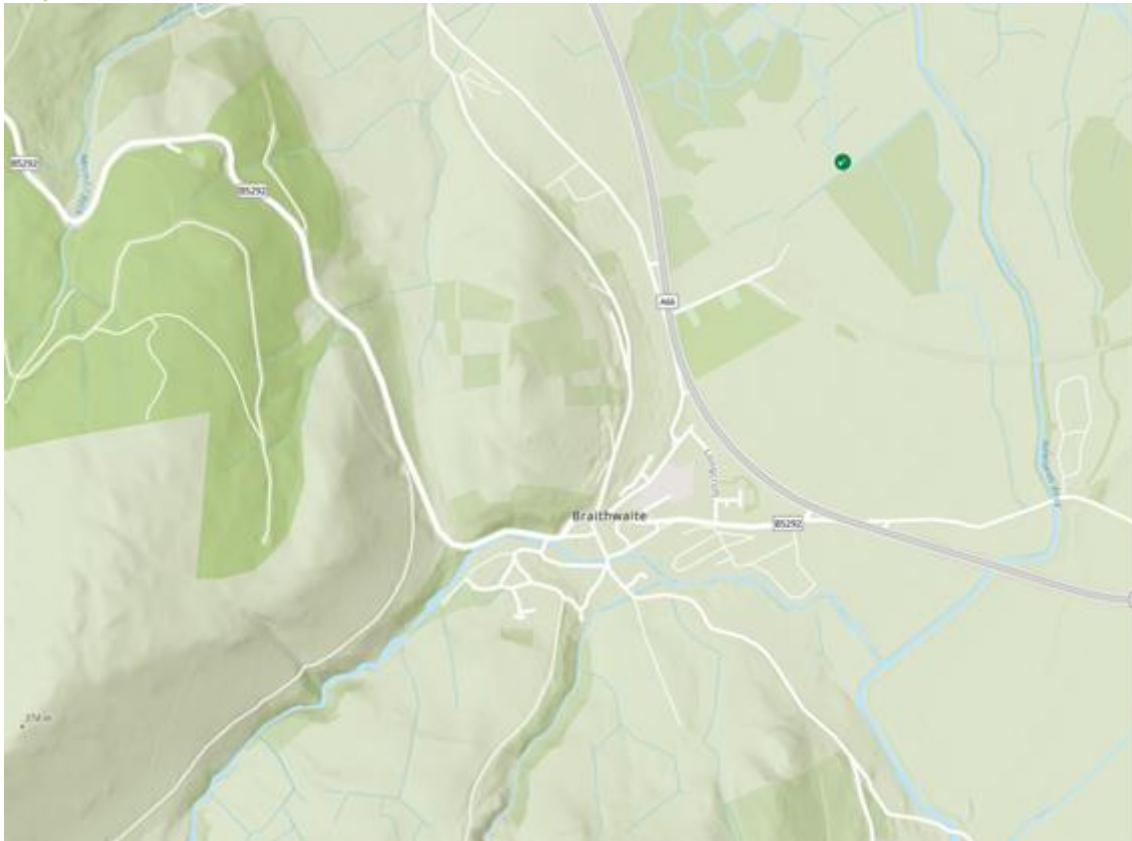


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

## Context

Sometimes, water can enter our wastewater pipes that they were not designed to receive. One source of these additional flows can be groundwater infiltration which can occur through pipe defects, leaky joints or issues with manholes. Extra water in the network can cause the sewer capacity to be exceeded, leading to sewer flooding or contributing to storm overflow activations.

As part of our ongoing work to maintain an effective network and achieve Better Rivers for the North West, our Infiltration Reduction Plans show our efforts to date and next steps to address infiltration and inflows in the catchment. This plan covers the Braithwaite drainage area and the associated overflow the Braithwaite Pumping Station Storm Overflow (ALL0056SO). In 2022, infiltration was identified as a potential leading cause of the storm overflow discharging. The purpose of this plan is to further investigate and address this. If groundwater infiltration is found to be a leading cause of spills, interventions will be assessed and this Infiltration Reduction Plan will be updated accordingly. If not, this plan will end at the survey stage and next steps will be processed through other relevant workstreams.



**Figure 2:** United Utilities – Better Rivers – Storm Overflow Map (September 2024). The green dot marks the the Braithwaite Pumping Station Storm Overflow.

Braithwaite village in Cumbria lies around 2.5 miles from Keswick between Derwentwater and Bassenthwaite Lake. It is situated at the foot of Whinlatter Pass, sitting in a valley surrounded by hillsides.

## Investigate

A desktop study was undertaken using available data to understand the extent of infiltration in the sewer network of the drainage catchment. The following data (where available) was analysed to determine the scale and location of potential infiltration:

- Relevant flow and depth data
- Operational information
- MCERTS Data
- Hydraulic models of the catchment
- River Levels
- Groundwater (borehole) data
- Spill analysis
- Topographical and Sewer maps

The assessment concluded that infiltration is possible in the catchment and most likely driven by slow response run off. The assessment also identified areas of the catchment where public sewers cross the local watercourse. Potential interactions of the water course with the sewer via highway gullies or defects could contribute to flows in the network.

From these findings, it was recommended that CCTV surveys are completed to identify potential infiltration sources. The CCTV survey should also identify if there is infiltration of the watercourse into the sewer or land drainage connected into the sewer, which can be removed.

## Survey

Comprehensive CCTV surveying of the area is planned for Winter 2024 to identify possible infiltration and inflows to the sewer. This may be extended to Winter 2025 if surveying is not conclusive. The CCTV survey information will then be assessed using Artificial Intelligence to identify outstanding infiltration and inflow issues that need addressing.

As well as CCTV, surface water modelling software will be used to complete a hydrological and topographical assessment to identify opportunities for natural flood management in the catchment to reduce the impact of rural runoff on sewer capacity.

## Next steps

Braithwaite is currently in the surveying stage of identifying and addressing infiltration (see Figure 1). If the CCTV survey reveals groundwater infiltration, interventions will be considered, and the site will follow an iterative intervention regime to monitor the efficacy of the solution. Remedial works at Braithwaite could include, but not be limited to, relaying sewers, lining sewers, sealing manholes or disconnecting inflows. This would be expected to be completed in 2025.