

Brough

Infiltration Reduction Plan

Last Updated: November 2024



Executive summary

Brough in Cumbria is currently in the survey stage (see Figure 1) to address infiltration and reduce spills at the Brough Wastewater Treatment Works Storm Overflow (017670004SO). A desktop assessment concluded that there is the possibility of significant groundwater infiltration that would reduce spill count if addressed. 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.

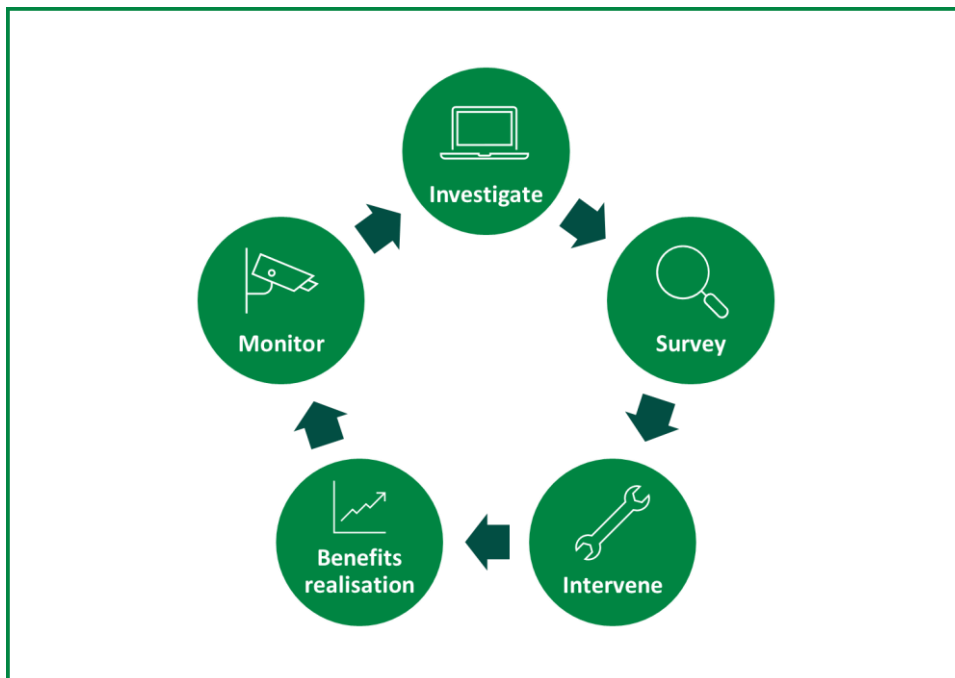


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

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 Northwest, our Infiltration Reduction Plans demonstrate our efforts to date and next steps to address infiltration and inflows in the catchment. This plan covers the Brough drainage area and the associated overflow, Brough Wastewater Treatment Works Storm Overflow (017670004SO). 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.

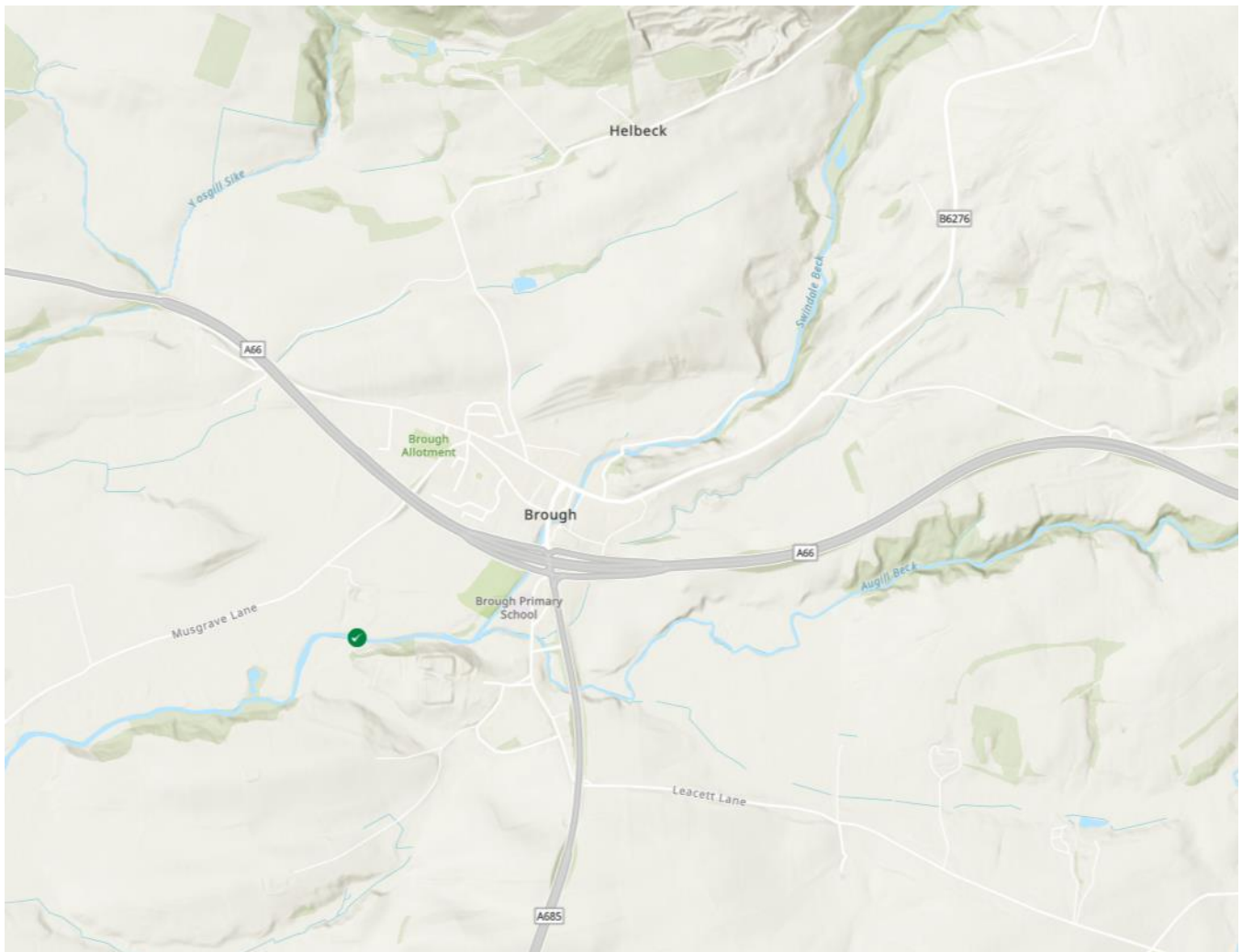


Figure 2: United Utilities – Better Rivers – Storm Overflow Map (September 2024). The green dot marks the Brough WwTW Storm Overflow.

Brough is a small town in the Eden Valley, Cumbria. Swindale Beck, a tributary of the River Eden runs through the town. It sits to the west of the Pennines but has a relatively flat topography.

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 significant groundwater infiltration was possible in the catchment. There is evidence of an elevated baseflow, possibly because of seasonally varying groundwater levels. As well as this, any reduction in baseflow at Brough could be sufficient to reduce spills.

Further observations also identified areas where the sewers cross the river. It may be that flow from these rivers can enter the sewer system via cracks in the sewer system or when there is a rise in water level.

From these findings, it was recommended that CCTV surveys are completed to see if there is infiltration of the water course into the sewer. The CCTV survey should also identify if there is land drainage connected into the sewer, which would be assessed for removal.

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

Brough 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 Brough could include, but not be limited to, relaying sewers, lining sewer or sealing manholes. This would be expected to be completed in 2025.