Cote Hill

Infiltration Reduction Plan

Last Updated: July 2025

United Utilities

Water for the North West

Executive summary

Cote Hill in Cumbria is currently in the monitor stage (see Figure 1) to address infiltration and reduce spills at the Cote Hill Wastewater Treatment Works Storm Tank Overflow (017670051ST). A desktop assessment concluded that there is a low likelihood of significant groundwater infiltration in the catchment. CCTV surveys confirmed the presence of infiltration and interventions to address this were completed in April 2025.

As groundwater infiltration has been found but is yet to be confirmed as a leading cause of spills to environment, interventions have been completed to address the localised infiltration identified during the Winter 2024 surveys. As more is known on the results of the interventions, this Infiltration Reduction Plan will be updated accordingly.

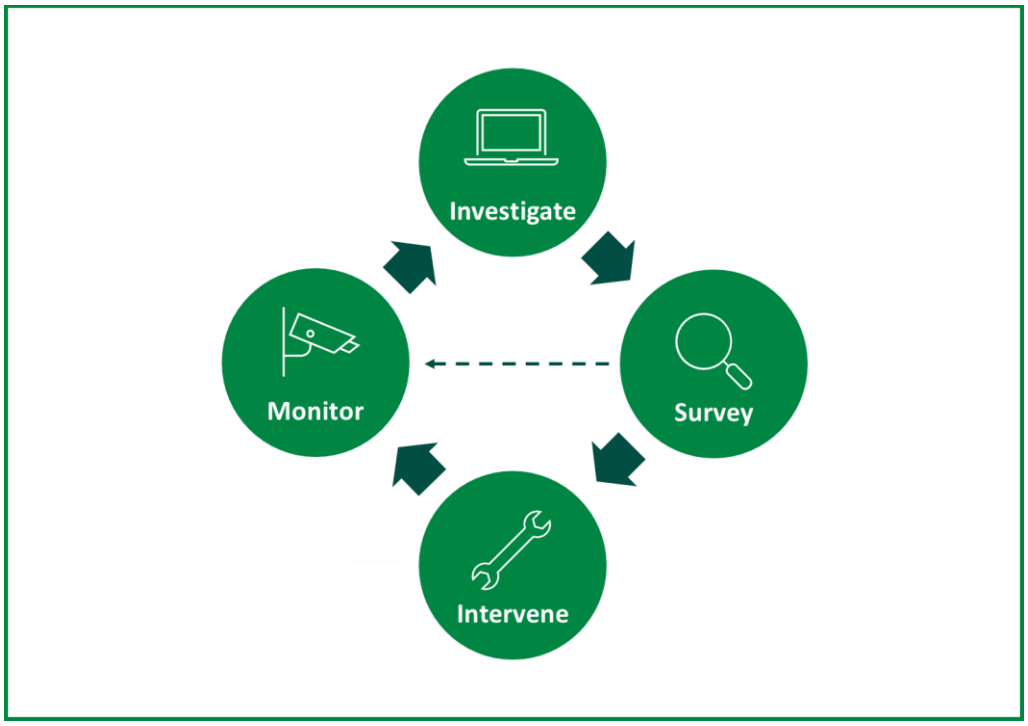

Figure 1: Iterative process to investigate, identify and address groundwater infiltration

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 demonstrate our efforts to date and next steps to address infiltration and inflows in the catchment. This plan covers the Cote Hill drainage area and the associated overflow, Cote Hill Wastewater Treatment Works Storm Tank Overflow (017670051ST). In 2022, infiltration was identified as a potential leading cause of the storm overflow discharging. The purpose of this plan is to capture the process to investigate, identify and address significant groundwater infiltration.

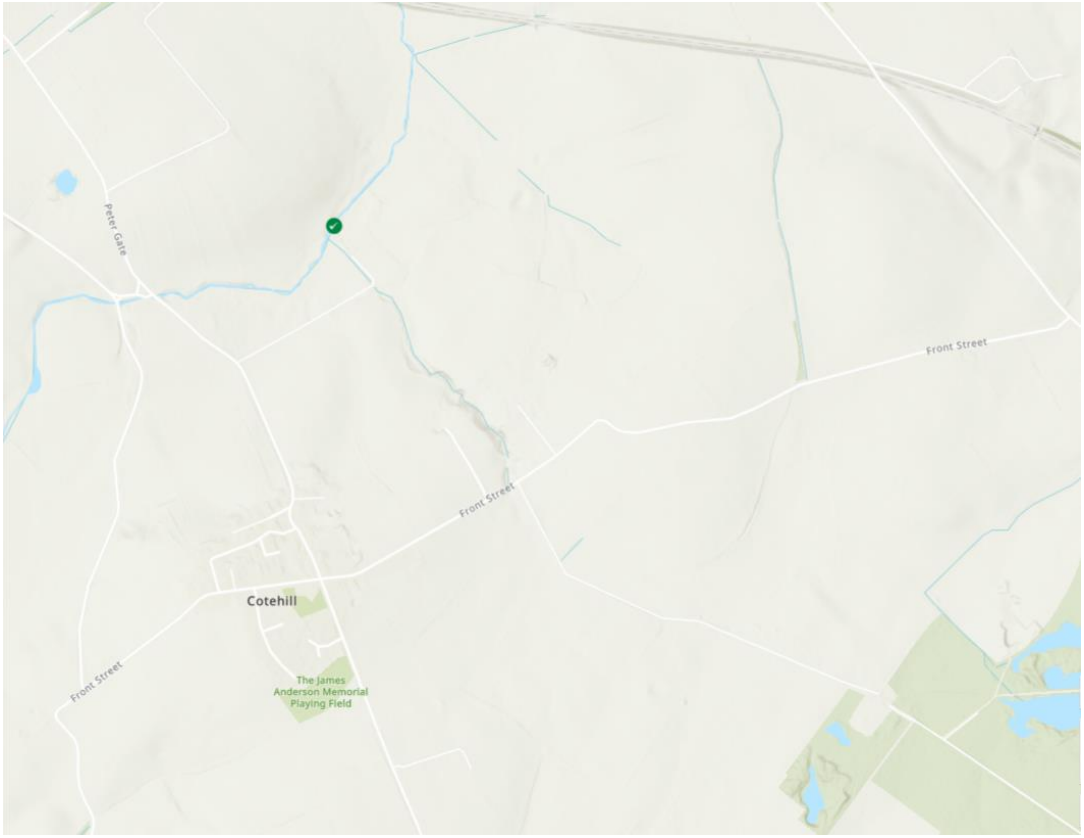

Figure 2: United Utilities – Better Rivers – Storm Overflow Map (September 2024). The green dot marks the Cote Hill Wastewater Treatment Works Storm Tank Overflow.

A village and parish in Cumbria, lies southeast of Carlisle, South of Pow Maughan Beck, tributary of the River Eden. The surrounding area features gently rolling hills and small wooded areas with primarily agricultural land use.

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 unlikely in the catchment. Monitoring at the storm tank indicated possible rainfall driven infiltration, however, there was little evidence of base flow that would be indicative of groundwater infiltration. Further observations also identified areas of the catchment where rural streams / ditches either cross or run adjacent to public sewers. It was noted that that flow from this stream could enter the sewer system through pipe defects, leaky joints or issues with manholes.

From these findings, it was recommended that CCTV surveys were completed to see if there was 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

As recommended, 694m of CCTV surveys were completed in Winter 2024 which did identify infiltration in the catchment. The CCTV surveys were reviewed by an engineer and assessed using Artificial Intelligence to rapidly identify and locate points of infiltration requiring remedial works. Infiltration in the sewer network was confirmed in various locations to varying levels of severity from heavy, to seeping and dripping infiltration.

Intervention

Remedial works were completed in April 2025. Lining of 310m of the sewer network using CP308 compliant liners and infiltration specific end seals has been been completed, to seal the sewer and prevent infiltration from all points identified during the Winter 2024 surveys.

Next Steps

Cote Hill is currently in the monitor stage of identifying and addressing infiltration. The site will follow the iterative process displayed in Figure 1 to monitor the efficacy of the remedial works and identify new points of infiltration, should they arise.