Skelton

Infiltration Reduction Plan

Last Updated: July 2025

United Utilities

Water for the North West

Executive summary

Skelton in Cumbria is currently in the monitor stage (see Figure 1) to address infiltration and reduce spills at the Skelton Wastewater Treatment Works Storm Overflow (017670116SO). A desktop assessment concluded that there was a low likelihood of groundwater infiltration however, surveys confirmed points of infiltration and localised remedial works were completed in March 2025.

As groundwater infiltration has been found but is yet to be confirmed as a leading cause of spills to environment, interventions have been assessed and completed to address the localised infiltration which was identified at the survey stage.

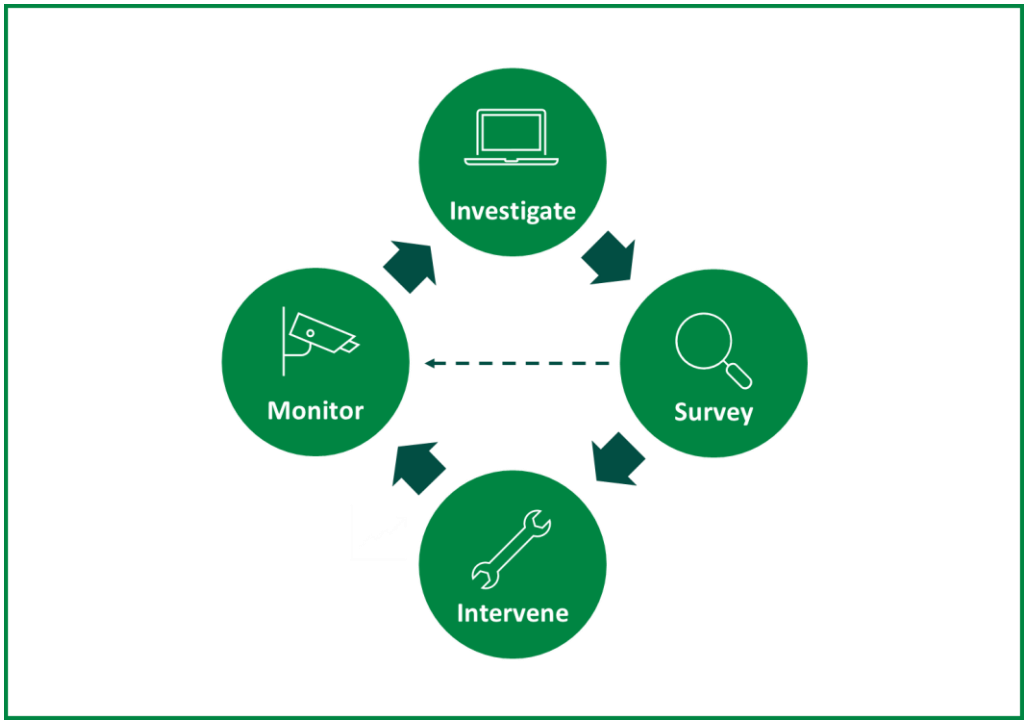

Figure 1: Iterative process to investigate, identify and address groundwater infiltration

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 Skelton drainage area and the associated overflow Skelton Wastewater Treatment Works Storm Overflow (017670116SO). 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 if required address this.

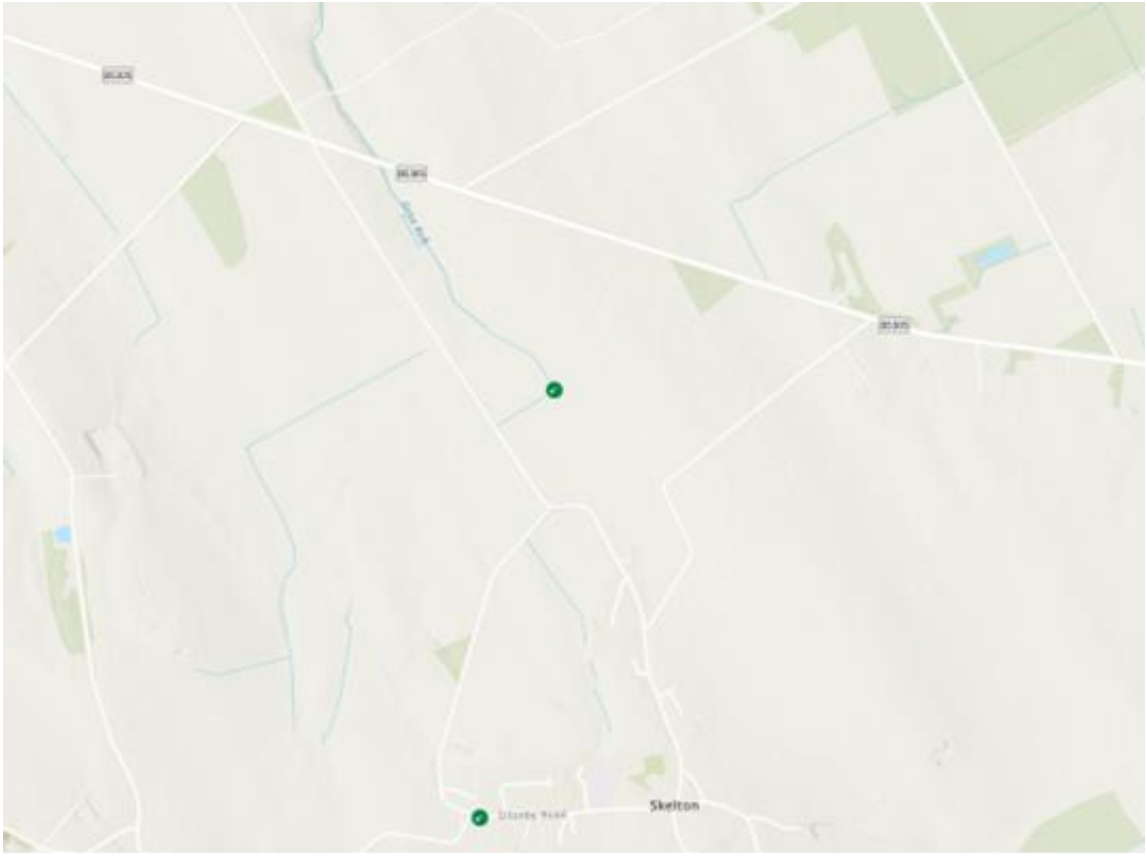

Figure 2: United Utilities – Better Rivers – Storm Overflow Map (October 2024). The green, most northerly dot, marks the Skelton WwTW Storm Overflow.

Skelton, North East Cumbria, is a small village and civil parish that lies around 6km outside the Lake District National Park Boundary, northwest of Penrith near Grise Beck.

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 infiltration was unlikely in the catchment. However, further observations identified an area of catchment where a rural stream runs 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, particular lengths of CCTV surveys were recommended to identify infiltration sources. From the desktop analysis, it was expected that if groundwater infiltration was found, it would not be significant enough to reduce spill count at Skelton Wastewater Treatment Works Storm Overflow.

Survey

As well as the recommended areas to survey, additional lengths were surveyed to take in the lengths running through the village and through the school, totalling 514m of CCTV survey completed in Winter 2024. The CCTV surveys were reviewed by an engineer and assessed using Artificial Intelligence to rapidly identify and locate points of infiltration requiring remedial works. Multiple points of infiltration were found within two lengths of the sewer network.

Checks were also carried out on all lateral connections, and none are suspected of receiving flows not bound to receive.

Intervention

Remedial works to address infiltration were completed in March 2025. Two lengths of sewer were lined with CP308 compliant liner (112.8m total) to seal the sewer and prevent infiltration from all points identified at the survey stage. One length of sewer was also cleared of roots and cleaned. All points of infiltration identified in the Winter 2024 surveys have been sealed.

Next steps

Skelton is currently in the monitor stage of identifying and addressing infiltration (see Figure 1). 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.