

Orton

Infiltration Reduction Plan

Last Updated: March 2025



Executive summary

Orton in Cumbria is currently in the survey stage (see Figure 1) to address infiltration and reduce spills at Orton Wastewater Treatment Works Storm Tank and Overflow (017270008ST & 017270008SO). A desktop assessment concluded that significant groundwater infiltration in the area is unlikely however CCTV surveys have confirmed infiltration and remedial works are due to be completed in Spring / Summer 2025.

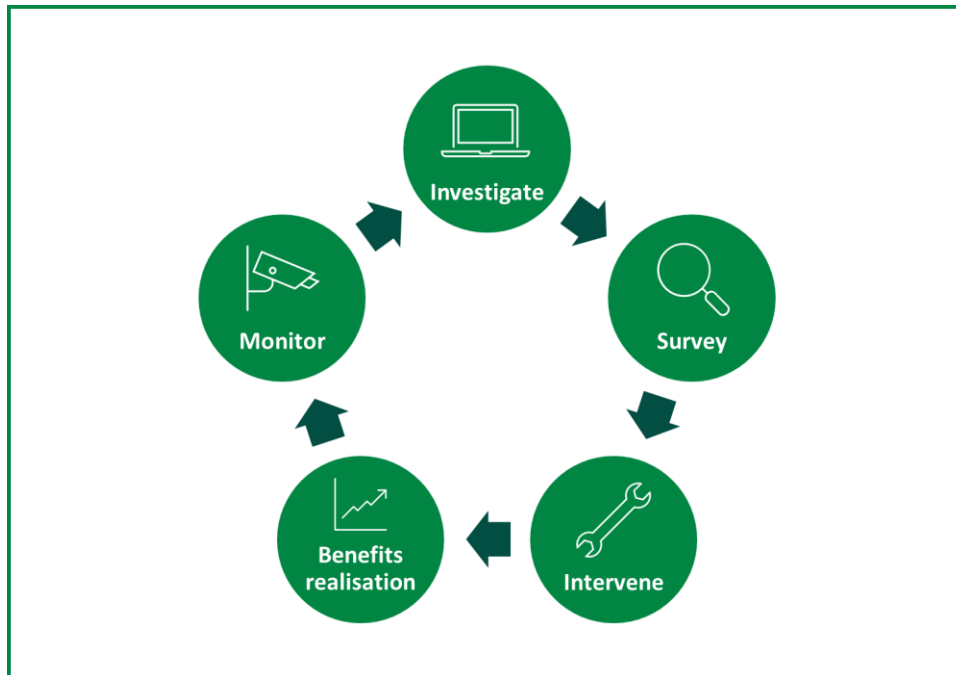


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

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 Orton drainage area and the associated overflow, Orton Wastewater Treatment Works Storm Tank and Overflow. 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.

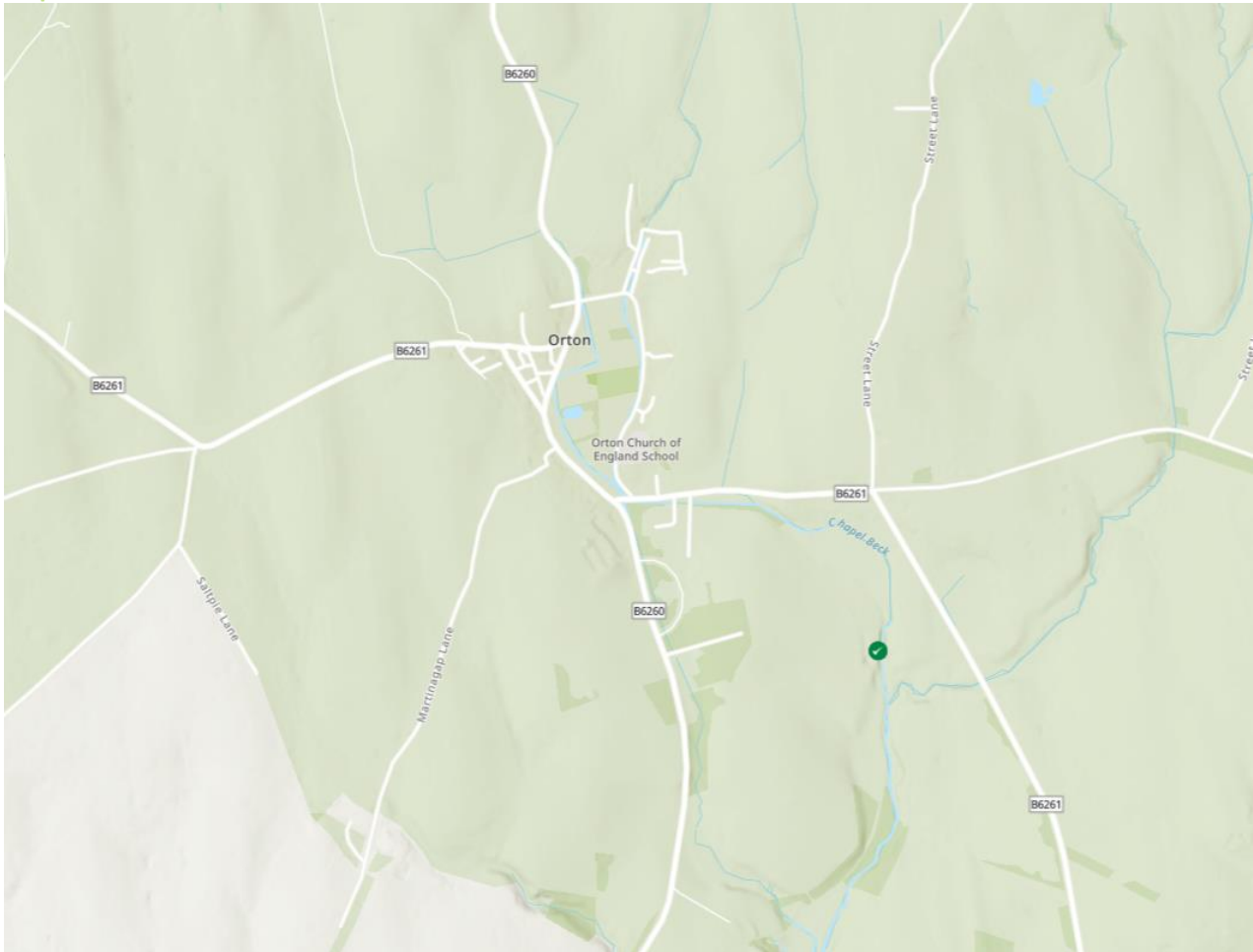


Figure 2: United Utilities – Better Rivers – Storm Overflow Map (September 2024). The green dot marks the Orton Waste Water Treatment Works Storm Overflow.

A small market village in Cumbria, Orton lies 15 miles South of Penrith in a relatively flat landscape. Chapel Beck, a tributary of the River Lune, flows through the village.

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 as there was little evidence of baseflow in the system. Further observations identified several areas of the catchment where sewers cross or run parallel to local rivers. It can be that flow from watercourses can enter the sewer system via pipe defects.

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

As survey works were recommended through the desktop investigations, 317m of CCTV surveys were completed in Winter 2024 and identified areas of infiltration within 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.

The network was also checked for inflows and no lateral connections are suspected of receiving flows not bound to receive.

Interventions

Remedial works to address infiltration are expected to be completed in Spring / Summer 2025. Remedial works at Orton could include, but not be limited to, relaying sewers, lining sewers, sealing manholes or disconnecting inflows, the best methods for the specific points of infiltration are currently being assessed.

Next steps

Orton is currently in the intervention 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.