

**Ingleton**

# **Infiltration Reduction Plan**

**Last Updated: March 2025**



## Executive summary

Ingleton, North Yorkshire had infiltration identified and interventions completed in late 2023, early 2024. A desktop assessment had concluded that groundwater infiltration is likely, surveys clarified this and remedial works were completed. As well as monitoring the benefits of previous interventions, further surveys did not identify active infiltration.

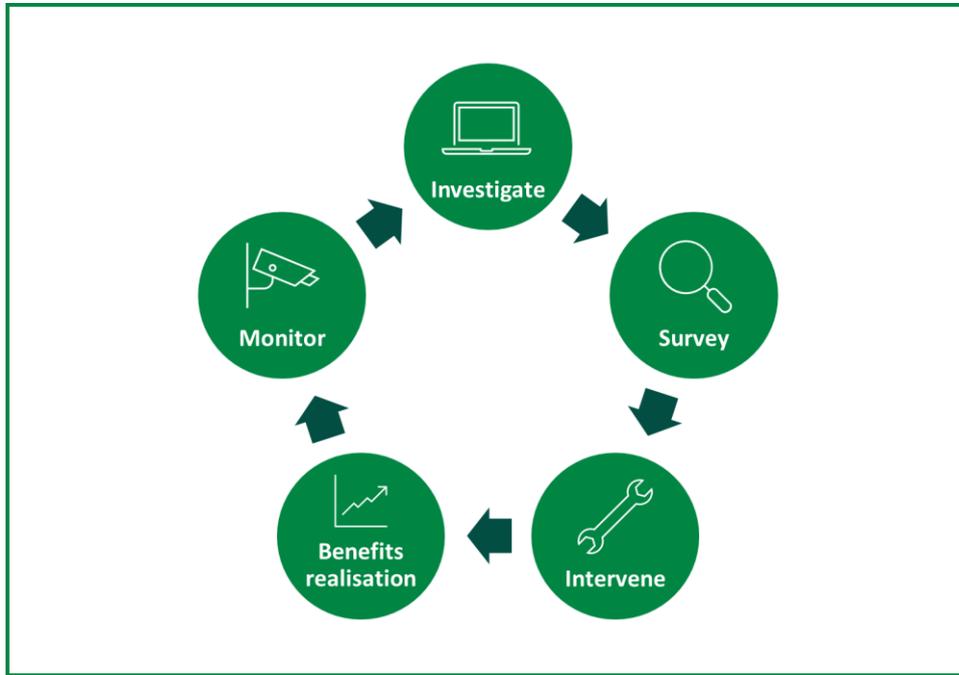
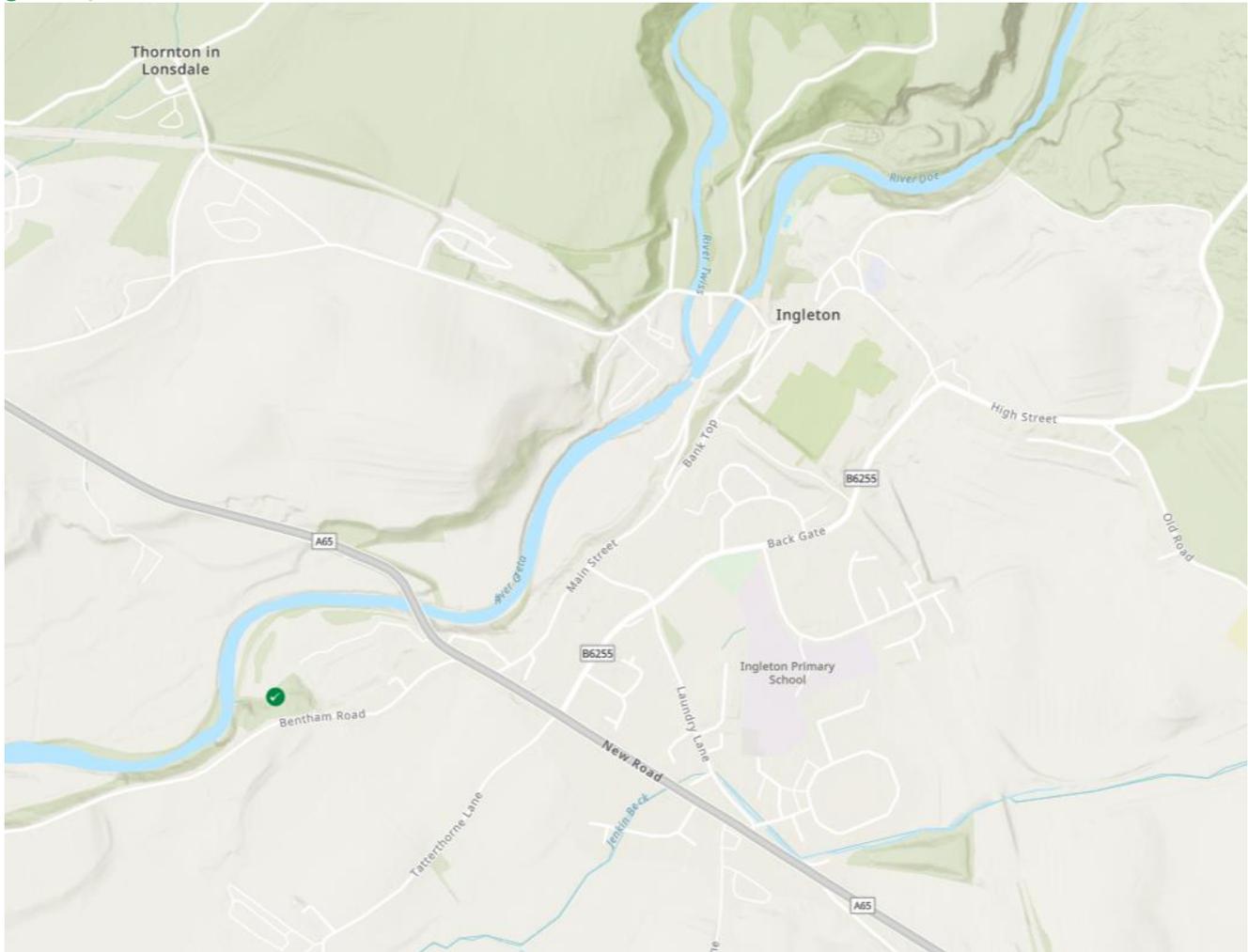


Figure 1: Iterative process to investigate, identify and address groundwater infiltration

## 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 Ingleton drainage area and the associated overflow, Ingleton Wastewater Treatment Works Storm Tank Overflow (017260005SO). In 2023, 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 investigation stage and next steps will be processed through other relevant workstreams.



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

Ingleton is a village in North Yorkshire, 17 miles from Kendal and Lancaster. It lies along the meeting point of the River Doe and River Twiss joining to form the River Greta which flows eventually to the River Lune. It sits at the foot of Ingleborough mountain peak (also a National Nature Reserve) and is surrounded by limestone countryside.

## 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 likely, however, the indicators could also be attributed to very slow response run off. Monitoring at the storm tank indicates ingress from high ground water levels in the catchment and a level of 'base' infiltration in the system that remains high in the winter could be due to rural run off or groundwater infiltration due to soil saturation.

There are also a few areas in the catchment where the sewer crosses the river or running close to the waterbodies. It may be that flow from these water sources can enter the sewer system through structural defects. To the east of the catchment, there are fields that fall towards the catchment, notably towards the combined sewer. There may be rural runoff (or land drainage) from these fields that drains to the combined sewer.

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.

## Surveys & Interventions

CCTV surveys in the area revealed infiltration (from sources other than groundwater) and lining of the sewer (110m) was completed in January 2024. As well as monitoring the benefits of previous interventions, further surveys were undertaken in winter 2024/2025. Of the 545m of the sewer network that was surveyed, no active infiltration was identified and therefore, no remedial works are planned for Ingleton.

## Next Steps

Ingleton is now in the monitoring stage of identifying and addressing infiltration (see Figure 1). The site will follow the iterative process displayed in Figure 1 to identify any more significant areas of infiltration, should they arise.