

# Reducing Pollution in Yorkshire's Rivers

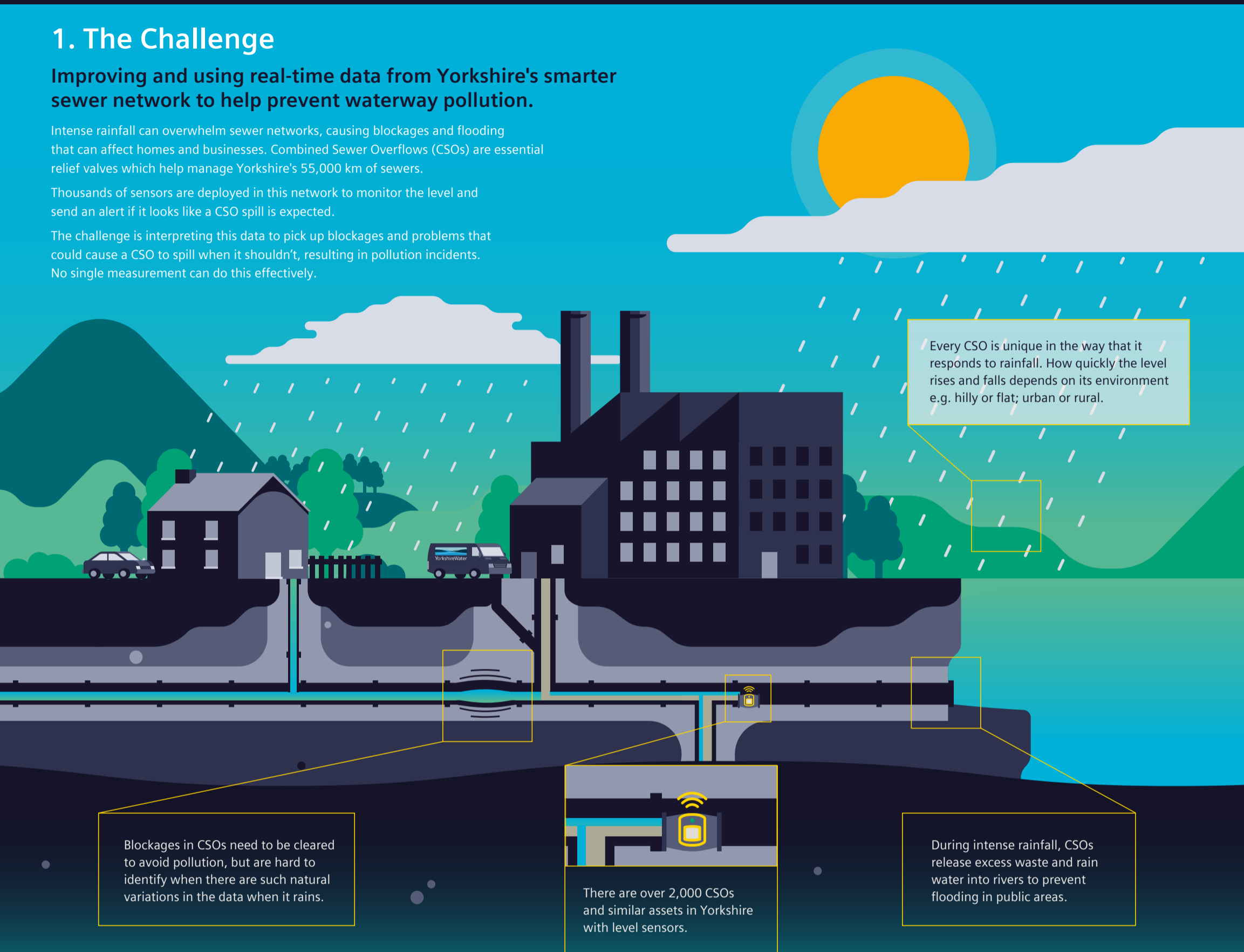
## 1. The Challenge

Improving and using real-time data from Yorkshire's smarter sewer network to help prevent waterway pollution.

Intense rainfall can overwhelm sewer networks, causing blockages and flooding that can affect homes and businesses. Combined Sewer Overflows (CSOs) are essential relief valves which help manage Yorkshire's 55,000 km of sewers.

Thousands of sensors are deployed in this network to monitor the level and send an alert if it looks like a CSO spill is expected.

The challenge is interpreting this data to pick up blockages and problems that could cause a CSO to spill when it shouldn't, resulting in pollution incidents. No single measurement can do this effectively.



Every CSO is unique in the way that it responds to rainfall. How quickly the level rises and falls depends on its environment e.g. hilly or flat; urban or rural.

Blockages in CSOs need to be cleared to avoid pollution, but are hard to identify when there are such natural variations in the data when it rains.

There are over 2,000 CSOs and similar assets in Yorkshire with level sensors.

During intense rainfall, CSOs release excess waste and rain water into rivers to prevent flooding in public areas.

## 2. The Solution

Combine Artificial Intelligence with real-time rainfall and sensor data to give early warning of any building issues.

### Predict

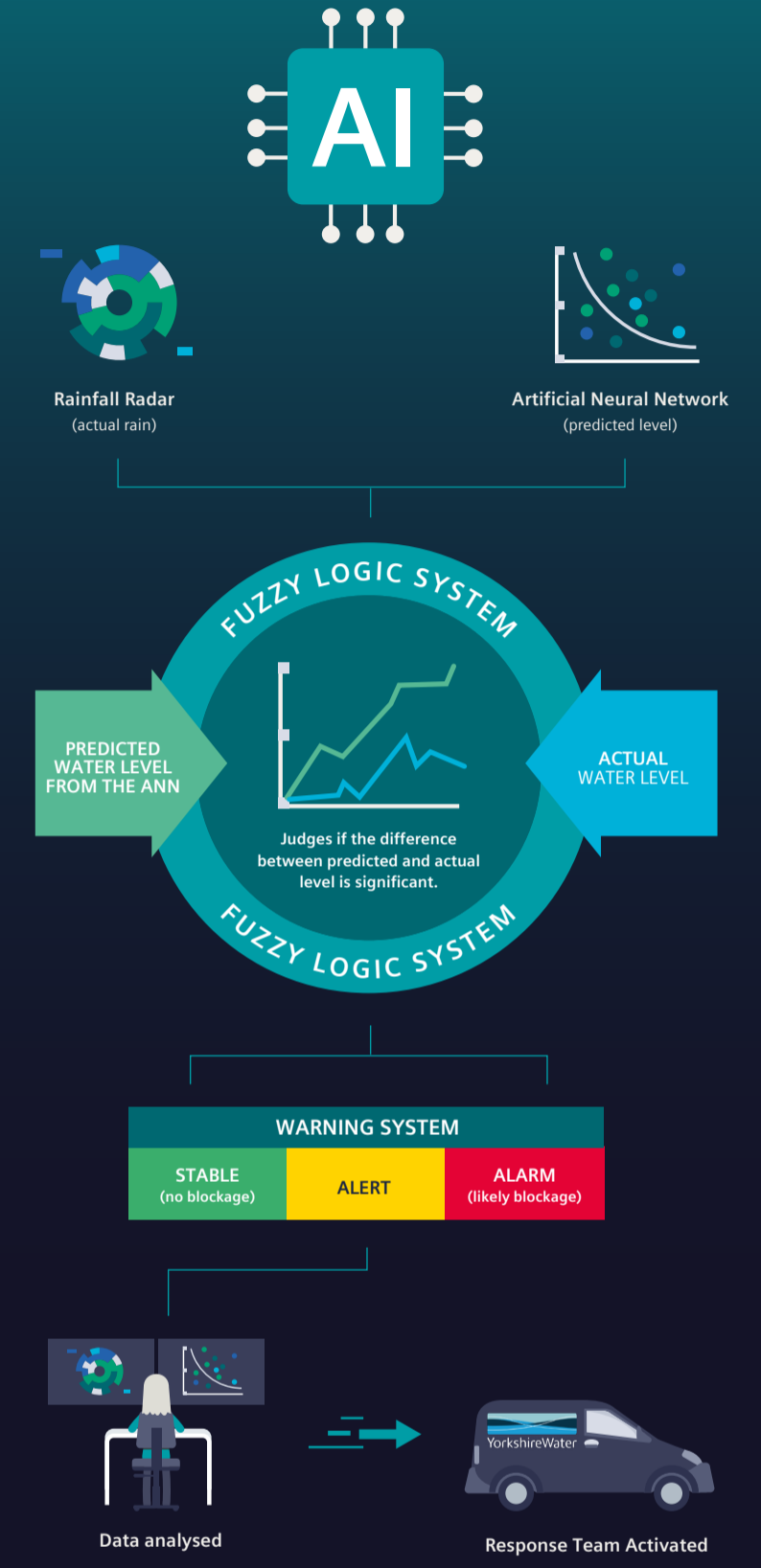
Train an AI system that uses sensor data to learn the 'normal' behaviour for every CSO when it rains.

### Classify

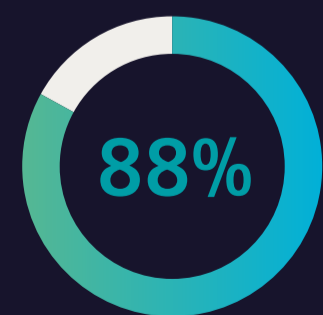
Use data from sensors in the CSO with innovative 'Fuzzy Logic' technology to assess if any differences are significant.

### Act

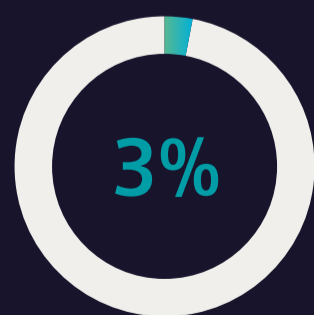
When an issue is found, a notification alerts Yorkshire Water to visit the asset and remove any blockages.



## 3. The Impact



Confirmed issues found by the AI system. 3-4 times more effective than Yorkshire Water's current methods.



False alarm rate; half the rate of the current system. Making finding issues more efficient.



Days of data analysed by the University of Sheffield to validate the impact of the 70 site pilot.



## 4. The Team

The University of Sheffield, Yorkshire Water and Siemens Digital Industries joined forces to reduce wastewater network blockages which cause river pollution.



Innovative early stage research into the potential of AI.



Yorkshire Water-experts in how to manage risk and operate wastewater networks.



Global leaders in building digital solutions and analytics for the water industry.

To find out more detailed information visit: [siemens.co.uk/siwa-blockage-predictor](https://www.siemens.co.uk/siwa-blockage-predictor)