South West Water

Pollution Incident Reduction Plan

Annual Review 2022

southwestwater.co.uk

Contents

Executive summary

This is an update to the Pollution Incident Reduction Plan we published in October 2022 and provides a summary of the actions and initiatives we have taken to drive down the number of pollution incidents.

It has been a challenging year with extremes in weather patterns. From extreme wet weather to a prolonged period of hot dry conditions. Each placing different demands on our infrastructure, resulting in an increase in Drinking Waters Service (DWS) incidents.

Our people and teams have continued to work tirelessly to provide the services our customers depend on in a time when there is an unprecedented demand on our infrastructure, the services we provide and the environment we continue to protect. We know we have a vital role to play in making our streams and rivers, and the ocean they flow into, clean and free from pollution. In 2022 for the second year in a row, the Environment Agency confirmed 100% compliance with bathing water standards for the region.

Despite the increasing demand on our assets and services the number of pollution incidents continue to reduce. In 2022 we have reduced pollution incidents by over 50% compared to 2020. This reduction has been across all our asset types apart from rising mains where we are part way through our proactive rising mains replacement programme.

We continue to increase investment in the region's infrastructure as part of our ongoing commitment to protecting and enhancing the natural environment.

Our self-reporting of pollution incidents is at its highest ever level at c.80% for 2022 compared to 68% in 2021 and 74% in 2020.

To reinforce our commitment to improving the environment in the South West we are proud to have launched WaterFit. WaterFit outlines how we will play our part, working with partners, customers, visitors and local communities to protect and enhance the South West's rivers and seas.

Find out more about our WaterFit plans here **southwestwater.co.uk/waterfit**

2022 Performance overview

We have made significant progress reducing the number of pollutions in 2022 compared to 2021 and 2020 and in accordance with the commitments made in our 2019 business plan and our own Pollution Incident Reduction Plan.

Total events

South West Water are committed to minimising the impact on the environment and for the fourth year running are able to report zero Category 1 (major) incidents.

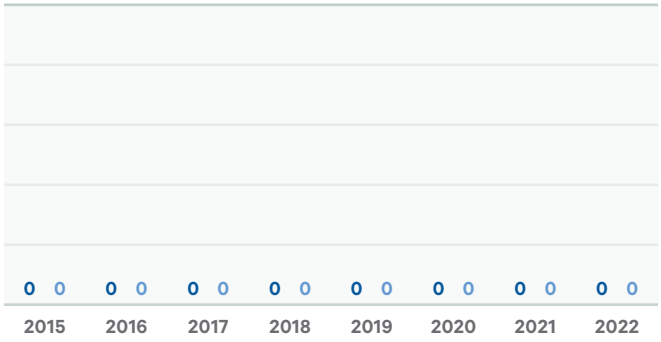
Category 1-3 events have been reduced by over 50% since 2020 and represent our best ever performance. We are further optimising the initiatives and lessons learned in 2022 to deliver further reductions in pollutions.

Category 2 events

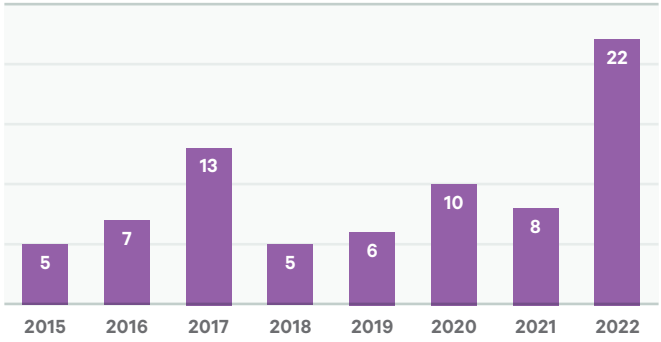
We are pleased with the 75% reduction in Category 2 pollution incidents from 2021 and wish to reaffirm our aim to reduce the most harmful events to zero.

Drinking water pollution incidents

Category 1 and 2 (number)

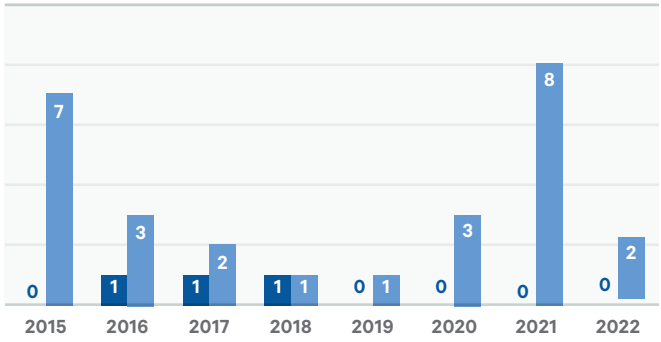


Category 3 (number)

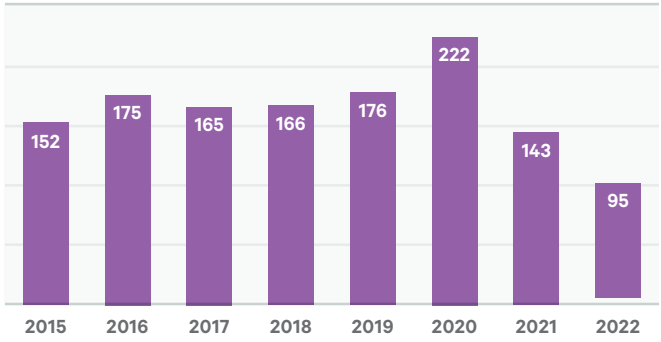


Wastewater pollution incidents

Category 1 and 2 (number)



Category 3 (number)

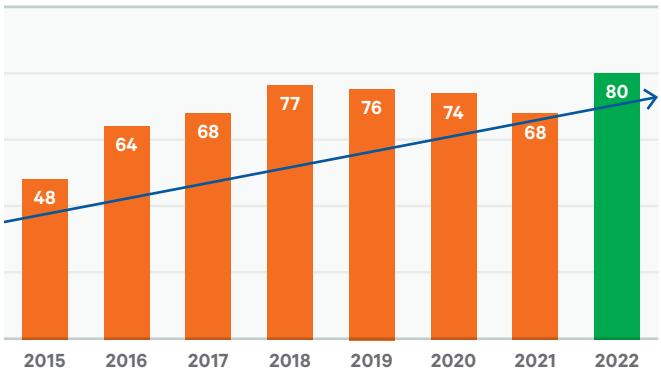


Pollution Category		Impact
1	→	MAJOR, SERIOUS, PERSISTENT and/or EXTENSIVE impact or effect on the environment, people and/or property
2	→	SIGNIFICANT impact or effect on the environment, people and/or property
3	→	MINOR or MINIMAL impact or effect on the environment, people and/or property

Self-reporting

We have improved our alarm handling and both remote monitoring and field-based data gathering capabilities to improve our understanding of potential pollution reports. These measures have delivered the necessary levels of self-reporting in 2022, and pleasingly we have achieved c.80% self-reporting.

Self reporting – Category 1-3 (%)



Source asset type

The improvement in overall performance can be attributed to key interventions in our Pollution Incident Reduction Plan introduced out over the last three years. Leading examples are the 'zero pump out' strategy which greatly improved resilience across the pump station asset base and the pollution 'hotspot' programme which reduced repeat events from previously frequently polluting assets.

Wastewater pollutions Cat 1-3 year to date comparisons
(January to December)

Asset	2020	2021	2022
STW	43	41	19
SPS	71	35	23
Foul Sewer	61	47	35
CSO	35	11	7
Rising Main	10	15	10
Other	5	2	3
Totals	**225**	**151**	**97***

* Subject to EA verification and validation

Rising mains

Rising main pollutions have been the source of some of the most impactful pollutions, especially when in close proximity to a watercourse (which many of our assets are due to being a peninsula). An extensive proactive rising mains replacement programme has improved the resilience of some key risk assets. Reducing the risk of pollutions from rising mains is also being driven by the deployment of telemetry and sewer depth monitors at assets within 50m of a watercourse. Data from this telemetry is analysed through data analytical software to give early warning of potential issues to prevent or reduce the impact of any pollution.

c.36% year on year **improvement**

Review of the Pollution Incident Reduction Plan

1 Improving our pollution reporting and assessment

ON TRACK

We have focussed significant resource improving our pollution reporting and assessment activity to better understand 'what' has occurred and report events in real time to the Environment Agency where practicable.

We are improving current systems and reporting by:

- Improving alarm handling, prioritisation, volume and reviewing the overall quality of alarms being managed by our teams to ensure that all alarms received add value. During 2022 we continued to reduce the overall volume of alarms, by removing 'nuisance' alarms whilst simultaneously increasing the volume of additional 'smart' alarms. Smart alarms combine asset performance data to give pre-emptive warnings at our sewage works and pumping stations. As part of the work to manage our hotspot sites we have upgraded the alarms received from these key sites.

  As part of our proactive approach to alarm management we have embedded several control reports within our Service Support Centre. These reports provide our front-line teams with information regarding asset performance ahead of any potential failure. We have implemented new, daily, weekly and monthly reporting, feedback and control processes to ensure that risks are identified and acted upon.

- Improving our 24/7 365 response capability by increasing resources in our Service Support Centre. This has delivered an increased focus on the detection of pollutions through active alarm management and the introduction of proactive control measures. We have increased our overall resources by 25% and created a 'Pollution Desk' with a Duty Manager improving our resilience and capabilities further.

  In January 2022 we implemented a new shift pattern that provided additional flexibility and resource capacity to support wet weather events and incident management. We also implemented a new logging tool 'J5' within our Service Support Centre to support the new teams. This system is a dedicated tool for control rooms that is used to manage the control of handovers and logging of incidents.

  Coupled with this, we have improved our operational procedures surrounding the management of wet weather events. The procedures allow us to rapidly stand up a full operational response both prior to and during an event. This has proved very successful in managing risk and reducing the impact during these periods.

We are improving the timeliness of our site analysis information by:

- We have extended our ability to collect near real time environmental information, by training and equipping our field staff with monitoring and sampling equipment. This enables field staff to report environmental data to our Service Support Centre at the earliest opportunity. This provides a more accurate assessment of incidents which we can use to inform the Environment Agency, customers, wildlife trusts, fishing associations and other environmental stakeholders. It also helps with any escalation of resource to minimise impact to the environment. We are also able to use this information to demonstrate to the Environment Agency that 'no impact' has occurred. We supplement this with photographs and additional data analysis where required.

We are supplementing our decision making and self-reporting by:

- Completing the installation of a further 9,000 monitors as part of our sewer level monitoring plan.
- Embedding the learning from our trial in the River Dart and River Tavy catchments with an external provider 'Meniscus'. The project uses an Artificial Intelligent (AI) engine to determine whether storm overflows are acting within their expected operating regime, or if they have fallen outside, indicating a potential issue that requires investigating.
- Optimising a risk model developed for combined storm overflow (CSO) performance that looks at daily performance (exclusive of weather). We have applied this across all CSOs in our region. In a similar way to the trials being conducted with Meniscus we have been able to predict the build-up of blockages that if left unattended could have led to a potential pollution.
- Building on the trial of our wastewater modelling tools provided by 'Innovyze' we are rolling out a 'Live' catchment modelling tool 'ICM live'. It is our intention to have live catchment models operating within our Service Support Centre as part of our wet weather management. The models will provide early warning of potential flooding or pollutions and enable us to deploy targeted operational interventions.
- Refining our website by providing a link on our home page to make it easier for members of the public to report a potential pollution incident to us.
- Launching a new 'Pollution app' for customers to report potential pollution events in an easy, timely way.

2 Root cause analysis

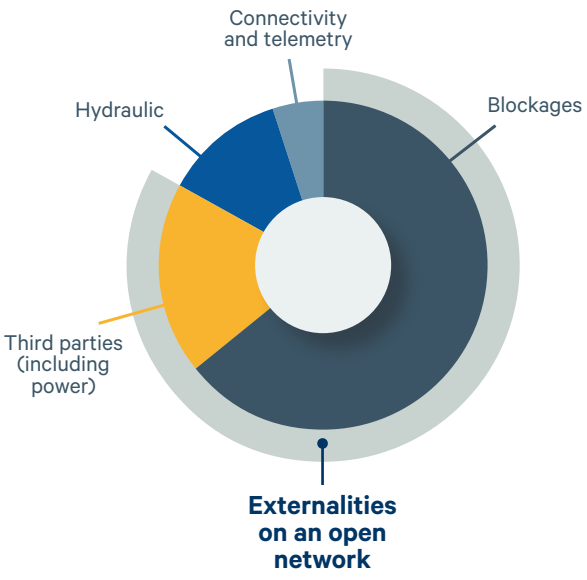
ON TRACK

Understanding 'how' and 'why' a pollution incident has occurred is driven by root cause analysis. We have discussed root cause analysis (RCA) approaches with several water companies and have also held a cross water company workshop on this topic. Whilst the fundamental principles of root cause analysis are the same, there is still learning that can be achieved through the sharing of good practice.

A root cause analysis is completed for all pollution incidents and near miss events, both event types present opportunities to learn and continually improve the RCA process. Our process is holistic and includes all aspects of the event, each RCA generates actions that is used to inform future maintenance, investment, process changes and training requirements to help prevent a repeat.

Our root cause analysis has been effective in understanding what interventions are required to prevent a specific incident happening again. It also provides learning for similar asset types which can be employed to further reduce pollutions occurring.

Identifying the root cause



3 Control systems and early warning

ON TRACK

So far we have described how we are changing our pollution reporting and assessment and how we can better understand the causes of these incidents. In this section we will describe what we have done to date to improve our control systems and early warning capabilities to stop a pollution incident occurring in the first place (or anticipating 'when' it might occur). We have done this by working in the following areas.

Improving our telemetry and monitoring coverage by:

- Extending our network of Event Duration Monitors (EDM) to better understand the performance of our assets. This includes further deployment of EDM monitors to record storm spills to the environment in addition to the 1,157 monitors already deployed. We now have c.100% coverage of storm overflows, extending our number of EDMs to c.1,600.

Changing our control room philosophy by:

- Continuing to improve our 24/7 data monitoring and service centre to provide an immediate opportunity to respond to alarms and escalate our response to prevent a pollution from occurring. We continue to review the data and alarms to ensure we are continuously improving our alarm response capability. We are currently engaged in a trial using radar rainfall and weather forecasts coupled with historic and current storm overflow operational data to model predicted flows in sewers, pumping stations and storm overflows. The benefits include sewer blockage detection and a reduction in alarms, facilitating targeted operational interventions to prevent pollution events. This is all part of developing a better understanding of our network operations in real time and predicting where we need to take proactive action to prevent pollution.

Improving our incident management response and recovery by:

- Learning from other Cat 1 and Cat 2 responders through our work on the Local Resilience Forum and National Incident Management (NIM) Group.
- Participating in multi-agency response activities. For example, the planning, preparation, response and recovery aspects related to the potential power outages signalled by energy providers over the winter.
- Using the outcomes from our root cause analysis to ensure we are able to address issues beyond the incident itself and detect trends to prevent similar incidents occurring.
- Evolving our incident management command structure with the introduction of a 24/7 gold wastewater service strategic manager has enable us to better coordinate, respond and communicate before, during and after incidents.

4 Asset specific plans

ON TRACK

We have invested significant resource to ensure our wastewater treatment works operate to the standards set by the Environment Agency under the Environmental Permitting Regulations. In addition, we are currently assessing the impacts of the Industrial Emissions Directive on specific sites that will fall under these regulations. We have done this by working in the following areas.

Reviewing and improving our activity at wastewater treatment works by:

- Reviewing and revising our structures in July 2021 so there is one Director with responsibility for wastewater treatment, networks and pumping stations to provide a more integrated approach to operational response and planning.
- Reviewing and revising our maintenance programmes with a focus on pumps and inlet works, ensuring the activity is better targeted towards the relevant risks.
- Reviewing and enhancing our training and development programmes for our operational staff to ensure they are equipped to excel in their roles.
- Implementing Lean RCM at a wider range of sites across the region.

Reviewing assets where repeat pollutions have historically occurred by:

- Undertaking a root cause analysis as previously described and developing a Hotspot Programme for SPS sites which will contribute to the reduction in pollution incidents from these sites. We have completed the majority of our planned programme of hotspot interventions and continue to inform the Environment Agency of our progress. We will also be assessing the impact of these interventions to ensure they deliver sustainable reductions in pollution incidents.

Reviewing and implementing a revised strategy for our pumping stations by:

- Adopting a zero pump out strategy to ensure we have the maximum amount of pumping capacity available at our Sewage Pumping Stations (SPS) to enable us to always comply with the permitted pass forward flow requirements. This includes ensuring we have the right kit available in the event of failure. We track the status of every pump at each of our SPS and aim to maintain a permanent install base of over 99% across these assets. The remaining 1% of pumps are covered by installation of hire pumps or alternative units within 12 hours of a pump failure. This has helped reduce the number of pollution incidents from sewage pumping stations significantly from 73 in 2020 to 23 in 2022.
- Married to this we target reliability in our SPS operation through a planned programme of sump cleaning. Aligned with a regular maintenance programme of servicing for the pumps and control system by our internal team of engineers.

Reviewing our wastewater sewerage network activities by:

- Undertaking misconnections interventions at key locations.
- Exploring new technology to assess the integrity of our sewerage network e.g. using CCTV coupled with Artificial Intelligence; and assessing the benefits of rising main monitoring capabilities using AI (see Ovarro information on page 13).

5 Influencing customer behaviour

ON TRACK

Customer behaviour can influence the performance of our assets and working with our customers on the impact of their behaviour is essential in addressing pollution risks over the longer term.

Where we are able to determine the source or cause of a specific blockage we are engaging with customers to explain how their behaviour can impact the environment. By analysing our data we have also employed revised maintenance schedules and target operational interventions to reduce the number of blockages.

We have analysed the impact of our campaign to understand how we may want to change and adapt our approach in preceding years to ensure we maximise the environmental outcomes from this project.

Illegal connections and third party events

AREA OF FOCUS

To address this challenge, we have made changes to our internal Sewer Misuse and Illegal Connection Team. They are tasked to undertake sewer surveys and customer engagement during and immediately after a pollution event. To facilitate this, additional sewer CCTV survey equipment has been purchased. We are developing a prioritised program of sewer miss-use locations where we can target our engagement with communities and businesses. This will reduce the frequency of events caused by third parties and minimising the harm caused to the environment.

Promotional material for the 'Love your Loo' campaign

6 Leadership focus – improving our environmental culture

ON TRACK

We continue to hold our Pollution Board (Tues, Thurs, Sat and Sunday), chaired by our CEO to maintain focus on our pollution incident reduction targets. This has led to a more robust reporting process being established.

We have established a Storm Overflow Steering Group to focus on our commitments to better understand the performance and impact of our storm overflows on the environment. In addition, our funding through the Green Recovery Fund will enable us to better understand the impact on a wider catchment basis through our work in the River Dart and River Tavy catchments.

We continue to work with the Environment Agency to ensure we are delivering against our commitments in our Pollution Incident Reduction Plan and meet with them on a quarterly basis.

Since the publishing of the Environment Act we have also committed to targeting zero 'Reason for not achieving good status (RNAGS) of our own impact on water quality by 2030 and additionally intend to target the following:

- Accelerate investments to target a 50% reduction in the number of storm discharges from our wastewater treatment works by 2025.
- Commit to sharing river water quality data in real time in the same way we do for bathing waters ahead of the Environment Act 2021 requirements.
- Undertaking an audit of our customer communications with the aim of improving frequency, reach and transparency of our environment activities and impacts through all customer touch points, including our social media channels.
- Expand the remit of the Board Environmental, Social, and Governance (ESG) Independent Committee to have clear line of sight to our environmental compliance activities, supported by a new Compliance Group to re-view and deep dive into environment compliance and reporting in a systematic manner.

Update on 2022 plan

An update on each of the PIRP activities included in our plan was shared with the Environment Agency at our Annual Review and is summarised below.

Hotspots

Operational and infrastructure investments at 51 sites were planned at the start of the year to improve the resilience of those sites and preventing pollutions events occurring. The program of work is largely on track for delivery by the end of the year. Focus is on delivering the final batch of sites in Q4 2022/23.

Rising mains

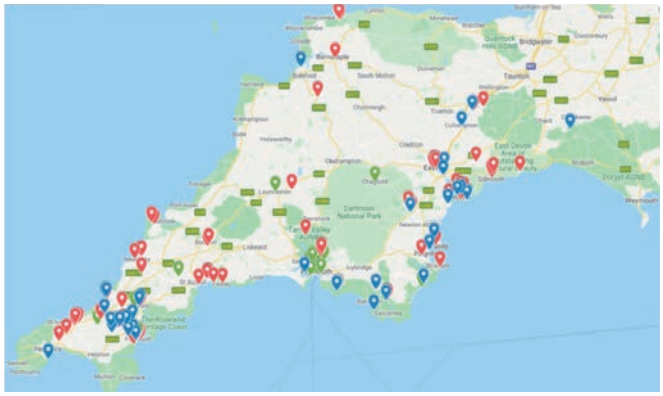
The original 18 rising mains included in the PIRP will be delivered on time, with 7 already complete. Of the additional 18 accelerated schemes we anticipate that 7 will be delivered before the end of the year with the remainder being delivered in the first half of 2023. Pollution events from rising mains have decreased by 20% YTD from 2021 demonstrating the impact of the asset investment that has been made.

Service and Support Centre (SSC) enhancements

In the last quarter we appointed an additional Wastewater Central Duty Manager to provide greater resilience in our SSC operation. Of greater significance is the appointment of a Central WWS Operations Manager. This role splits the management of the Central Duty Managers from the alarm team allowing for greater focus in key areas, including performance, improvement of processes and procedures, training and development and enhancing the processes with the Operational Field Teams.

Deployment of additional sewer depth monitors

After a successful trial in 2021/22 to help achieve our PIRP and WaterFit commitments we have taken the decision to significantly expand the current number of monitors. Sewer level monitoring with associated analytics is designed to detect unusual flow patterns and provide early warnings to the Operations Teams. This will allow the investigation of potential events that if left could result in a discharge from the sewer network. The use of real time monitoring and data analytics will aid the shift from a reactive to a predictive mode of operation. We will have 9,000 monitors installed in manholes across the 20,000km of sewer network in the region. The first 1,000 sewer depth monitors are being installed and are providing data and alarms for operational use by the end of 2022. With the additional 8,000 monitors delivered over the next two years.



Refinements to our plan

Lessons learned during the year and the outputs from our RCA process have resulted in some enhancements to our PIRP in a number of key areas including illegal connections to our network, sewer misuse and the detection of bursts on rising mains.

Illegal connections to our network

A number of the Cat 1-3 pollutions in the latest Environment Agency dataset are the result of illegal connections to our surface water network. The current process means that once an initial 30 day period has elapsed these events are assigned to South West Water (SWW) if we have not been able to evidence the source of the misconnection.

There are real challenges in providing the required level of proof within 30 days and it is unachievable in many cases because liability has to be acknowledged by the third party (individual or business). To address this new issue we have implemented the following;

- Opened discussions with the Environment Agency to explore process changes to make the process as efficient as possible.
- Made changes to our internal Sewer Misuse and Illegal Connection Team to enable them to undertake sewer surveys and engage with customers during and immediately after the pollution event.
- Purchased additional sewer CCTV survey equipment to facilitate this.
- Engaged an external provider, ECAS to undertake enforcement action against individuals and businesses which make an illegal connection and / or knowingly misuse the public sewer causing harm to customers, property and the environment.
- As well as the reactive response to illegal connections ECAS are proactively targeting fast food outlets and other known sewer misuse hotspots, across the region to prevent this kind of pollution.

External sewer floodings

Two external sewer flooding events in August were initially assessed as Category 2 pollutions. This is due to the amenity impact of the sewer flooding on businesses in the proximity of the surcharging manholes. These events were triaged as external sewer flooding events and thereby given a 4-hour response time (existing SLA). As a result we have amended our processes and SLAs. We now treat any external sewer flooding near a water course as a potential pollution and a subsequent 2-hour SLA is assigned.

Burst detection on rising mains

Our proactive rising main replacement program implemented this year is focused on replacement of mains with a high-risk of failure. In parallel, trials of a new 'burst detect' system provided by Ovarro were complete.

Ovarro

Working with our partner Ovarro we have been complete a comprehensive trail of their BurstDetect software.

BurstDetect is a method of preventing pollution from sewerage rising mains using the combination of existing monitoring and cloud analytics. BurstDetect requires no additional hardware and utilises existing asset data and real time telemetry. It then uses machine learning algorithms specifically focussed on the detection of suspected rising main bursts and creation of targeted time sensitive alerts. This will allow rapid detection and actionable alerts to the business growing our capability to proactively investigate potential pollution events.

The project is currently in a final test phase and a rollout plan is being developed incorporating the focussed training and awareness required for the Alarm Team and Central Duty Managers prior to go live.

How does it work?

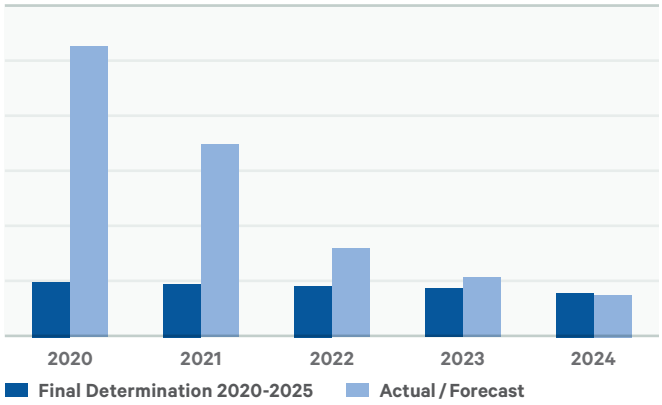
- Existing monitoring
- Multi-tenant Software-as-a-Service in Azure cloud
- Machine learning algorithms
- Alerts sent by email (other routes to follow)

Future outlook

The delivery of the PIRP has been successful in reducing pollutions and will continue to be undertaken and optimised further in 2023.

The further refinements planned in 2023 will support the successful delivery of our business plan targets and support the attainment of a 4☆ EPA status.

Wastewater – Category 1-3 pollutions per 10,000km



Action	Target date
→ Hotspot programme launched in 2021/22 delivered c.210 interventions in year 1 and a further 50+ in 2022/23. We are currently finalising our 2023+ hotspot programme.	2021-2025
→ Enhancing our processes for investigating and tracking illegal connections to our systems – which cause pollutions as well as improving the process for agreement with the Environment Agency in 2022.	Complete – ongoing BAU activity ✓
→ Investment in technology and systems supplemented by additional data analytics personnel to review trends, additional service, and support centre personnel to review and triage additional alarms. Alongside additional field staff to respond to triaged data. The implementation of our new 'SpillSure' system will complement these initiatives in 2023 to further drive down pollutions in this asset group.	Complete – ongoing BAU activity ✓
→ The implementation of our new 'SpillSure' system launched in 2022 will complement our WaterFit initiatives to reduce spills from CSOs – further driving down pollutions in this asset group.	Complete ✓
→ Developing our root cause analysis (RCA) using CREWW (our partnership with the University of Exeter) to analyse trends and data to better respond to the root cause of pollutions.	2022-2023
→ Proactive rising main replacement programme as part of our WaterFit investment commitments we are delivering 14-20 in 2022/23 and a remainder in 2023/24 – all of which will reduce the risk of pollutions (and potentially serious pollutions).	2022-2024
→ Further targeting of illegal connections and engaging with key customers (such as fast-food restaurants) prone to blockages.	2023
→ Optimised investment programme team for both pollutions and storm overflow priority sites – delivering complementary interventions efficiently.	2023
→ Extending our award-winning AI (Artificial Intelligence) CCTV sewer survey initiative.	2023
→ Ovarro will be deployed region wide following the successful pilot during 2022.	2023
→ Installing 9,000 sewer depth monitors by 2025 to provide enhanced monitoring of our network, identifying potential issues before they arise.	2023-2025

Case studies

Case study 1

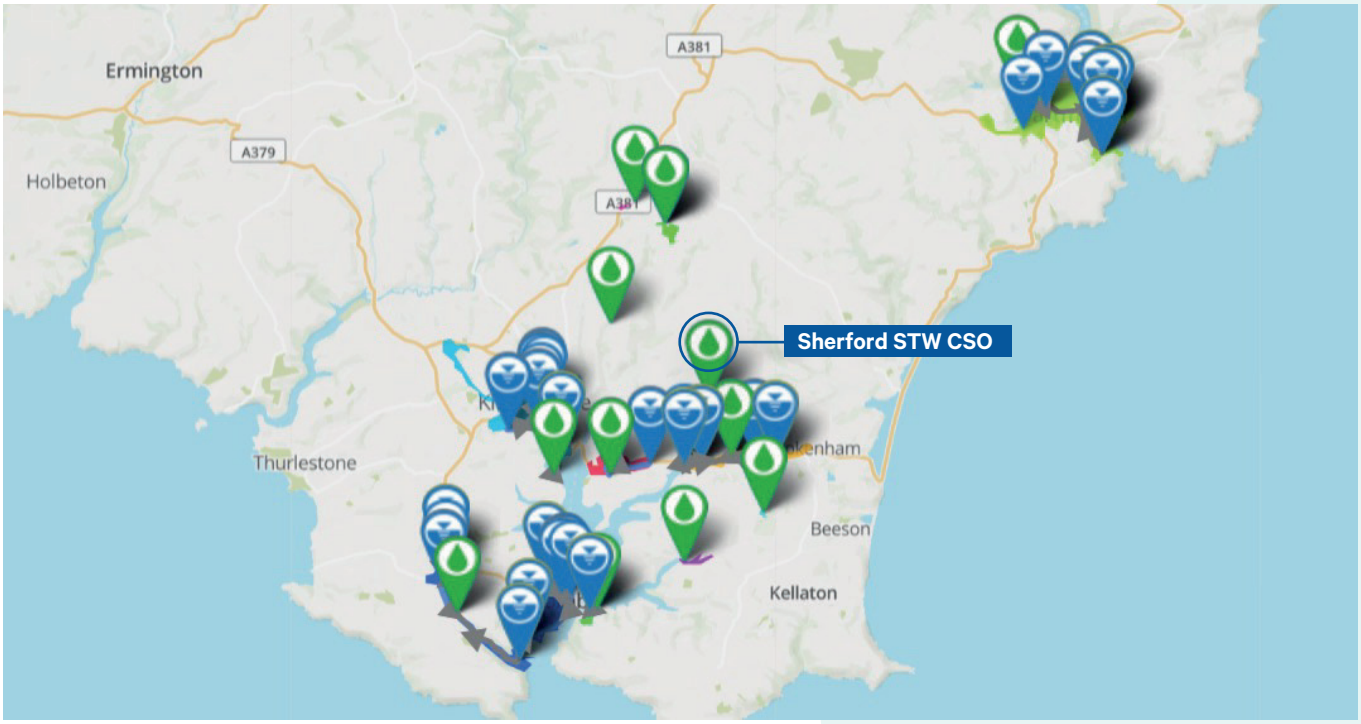
Meniscus

Five Meniscus alerts were received from Sherford STW CSO between 04:00 Sunday 9/10/2022 and 20:00 Monday 10/10/2022.

- → Site check requested by Central Duty Manager
- → Debris interference confirmed by Operations Team, cleared issue
- → Further alert triage and Operational Team feedback resulted in repeat issue diagnosed
- → Operational Team recommended recirculation is installed
- → Passed to local team to review recommendation

meniscus

The Meniscus alerts and subsequent investigation resulted in a hard engineering solution to resolve the repeated debris build up due to low flow.



Case study 2

Illegal connection investigation

Plympton

In March 2022 a concerned member of public (MoP) reported via the SWW online reporting page they had seen dirty water and sanitary products in a watercourse.

The same day our operators investigated and confirmed sewage related debris was discharging to the watercourse from a surface water outfall.

Their initial investigations confirmed the sewage and debris was not originating from the foul sewer network confirming the most likely cause as a domestic illegal connection. Initial feedback confirming a suspected illegal connection was provided to the Environment Agency (EA).

Further investigations in the sewerage catchment over the following days located a number of potential sources. Subsequent dye tracing confirmed that three properties were illegally connected to the surface water network and were the cause of the MoP report.

The case was passed onto the Illegal Connection Team who initiated corrective action with the with property owners.

Investigations conducted by the Illegal Connection Team established that the foul drainage had been misconnected to the surface water network by contractors. The owners acknowledged responsibility and engaged with the contractors to undertake remedial work.

Remedial works were completed at all three properties in August and final confirmation provided to the EA.

Left **Illegal connection at manhole chamber (surface water MH has the circular cover)**

Above **Surface water outfall showing evidence of illegal connection**

South West
Water

southwestwater.co.uk