

# Pollution incident reduction plan 2023-24



**Wessex Water**  
YTL GROUP

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*We consider ourselves an environmental services company*

# Introduction

During 2022 we have continued to invest in our network monitoring initiative across the whole of our region and worked closely with customers and our Water Guardians in order to improve our performance with regards to pollution incidents.

These initiatives have once again shown their importance, providing early indications of where things aren't working in the way that they should and allow us to respond more quickly.

The results, however, do show that the number of pollutions and the number of serious pollutions has not improved to where we would like it to be. This in part was due to drought conditions in our region, which meant that even small discharges to the environment had a more pronounced effect and due to improved data gathering through the Event Duration Monitor (EDM) installation programme.

We have once again seen our highest ever level of self-reporting of pollution incidents, clearly demonstrating our commitment to be transparent and timely with our reporting of all pollution incidents.

We are clear with our aims to reduce pollution incidents in our region and continue to enhance our capabilities with regards to network monitoring. We are also increasing our engagement with our customers to tackle issues around sewer misuse with regards to fat, oil and grease (FOG) and the disposal of wet wipes. In addition to these steps, we are also enhancing and improving our real-time monitoring of our water recycling centres to allow a more timely response.

Our aim is to reduce our pollution incidents for 2023-24 by continually monitoring and reviewing our plan and make the appropriate changes where we believe that there are more effective measures that we should be taking. All of our activities are considered and reviewed through our governance process (Appendix 2). This document builds on the work we have done since our initial pollution incident reduction plan (PIRP) in 2020 and shows the continued evolution of our activities. We focus in this document on the changes we have made to water recycling centres (WRC) and sewage pumping stations (SPS) plus an update on some of the other activities and our performance. A summary of activities in 2022 is included in Appendix 1.



**Daniel Humphrey**



Daniel Humphrey

# Background

## Purpose

One of Wessex Water's four strategic aims is to protect and improve the environment. We consider ourselves an environmental services company and our aim is to ensure that none of our activities cause environmental pollution.

Many of the activities we carry out have the potential to cause pollution to the water and land environment if something goes wrong. When sewage or even clean water escapes from our systems, it can lead to environmental damage.

Our original pollution incident reduction plan (**PIRP**) document<sup>1</sup> summary explains our historical and current water environment pollution performance and our plans to continuously improve.

This document provides an update on the third year of implementing our plan, highlighting work undertaken, our successes, and our key activities and opportunities to develop the plan further during Asset Management Plan 7 (AMP7).

## Pollution incident reduction plan (PIRP) approach

Our aspiration is to cause no pollution incidents - delivery of this plan will lead us towards this.

The four main delivery themes for the PIRP are:

- people and process
- assets and maintenance
- customers and stakeholders
- data and analysis.

## Pollution targets

Achieving our aims will take time and in the more immediate future we are aiming to meet the targets set out in the Water Industry Strategic Environmental Requirements:

- serious pollution incidents must continue to trend towards zero
- trend to minimise all pollution incidents (category one to three) by 2025. There should be at least a 40% reduction across the industry compared to numbers of incidents recorded in 2016.

For us this means targeting zero category 1 or 2 incidents and fewer than 69 category 3s from wastewater assets by the end of 2025.

<sup>1</sup><https://corporate.wessexwater.co.uk/our-future/our-plans/pollution-incident-reduction-plan>



# Summary of incidents in 2022

For 2022 we have not achieved our total pollution target, reporting a total of 110 category 1-3 pollution incidents against a target of 78. The serious pollutions target was exceeded, having 5 incidents deemed as serious pollutions (category 1-2) against a target of 1 incident. These are disappointing results especially as we have continued to drive our incident reduction plan.

The overall number of pollution incidents for category 1-4 in 2022 have been similar to those in 2021, however there has been a shift in the proportion that are category 4 up to category 3. This has been influenced by two factors:

- Drought in the summer of 2022 exasperated even very small spillages, resulting in an impact. Water resources in the region were declared in drought conditions by the Environment Agency (EA).
- Improved use of data gathered from EDM allowed for analysis and identification of historic spill events, which were then reported to the EA. These incidents defaulted to a category 3 under the Common Incident Classification Scheme (CICS) but given their historic nature it was not possible to carry out on-site investigations to confirm details or classification.

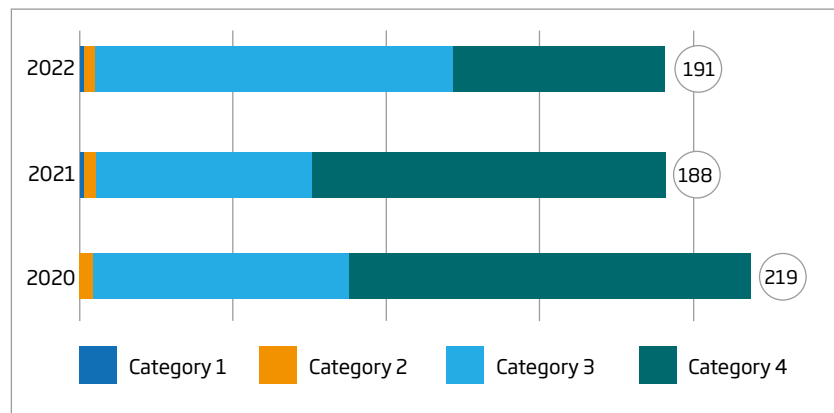


Figure 1: Annual self-reporting statistics by pollution category

Our self-reporting target, which is deemed as Wessex Water reporting an incident to the EA directly, has continued to improve year on year since 2020, exceeding the target of 80% for all reports achieving 92%

in 2022. The 90% target for monitored assets which is specified as water recycling centres and sewage pumping stations, was also exceeded, achieving 97% self-reported incidents. Both of these self-reporting targets are key activities that our 'people and process', and 'customer behaviours' workstreams have contributed to.

There are two areas of note in the pollution numbers for 2022:

- Storm Eunice on 18 February 2022 caused widespread impact across the UK particularly to power companies. Western Power Distribution (which supplies power to the Wessex Water region) reported 2,787 incidents of power loss across their entire region, stating that the combination of Storm Eunice and Storm Franklin were the worst storms the region had seen to date. Due to the significant impact on the distribution network, Western Power Distribution was unable to give accurate estimates of restoration at the time. 314 Wessex Water waste sites were impacted by the widespread power issues between 18 and 20 February 2022. This led to nine pollution incidents related to this one storm event within Wessex Water.
- Wessex Water have chosen to use EDM data to be proactive with our reporting of past incidents to the EA. The installation of a significant number of EDM monitors has provided us with data that we did not have before. Despite not always having verified these spills occurred from a physical check on site, Wessex Water has chosen to lead the way and be proactive in this area of reporting. The EA and water companies are now working together to develop a consistent approach for handling of this data. However, our proactive approach has resulted in 21 incidents being reported to the EA based on this retrospective data.

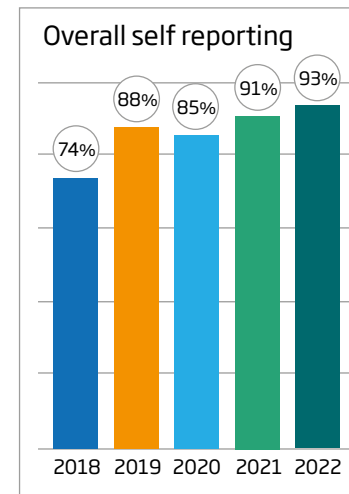


Figure 2: Overall self-reporting results from 2018 to 2022



## Asset types

In 2022 there has been a step change in the number of pollutions reported at both WRCs and SPSs. WRC incidents increased from an average over the previous four years of 22 incidents to 40 reported incidents and SPS incidents increased from an average of 5 incidents to 21 incidents in 2022. These areas are addressed in more detail later in this document.

The PIRP has previously been focused on sewerage assets, particularly foul sewers due to most incidents emanating from these assets in the past. Foul sewers have had an average of 31 incidents per year and this has remained the same in 2022. Both surface water outfalls and rising main incidents have remained at a consistent number of incidents for 2022.

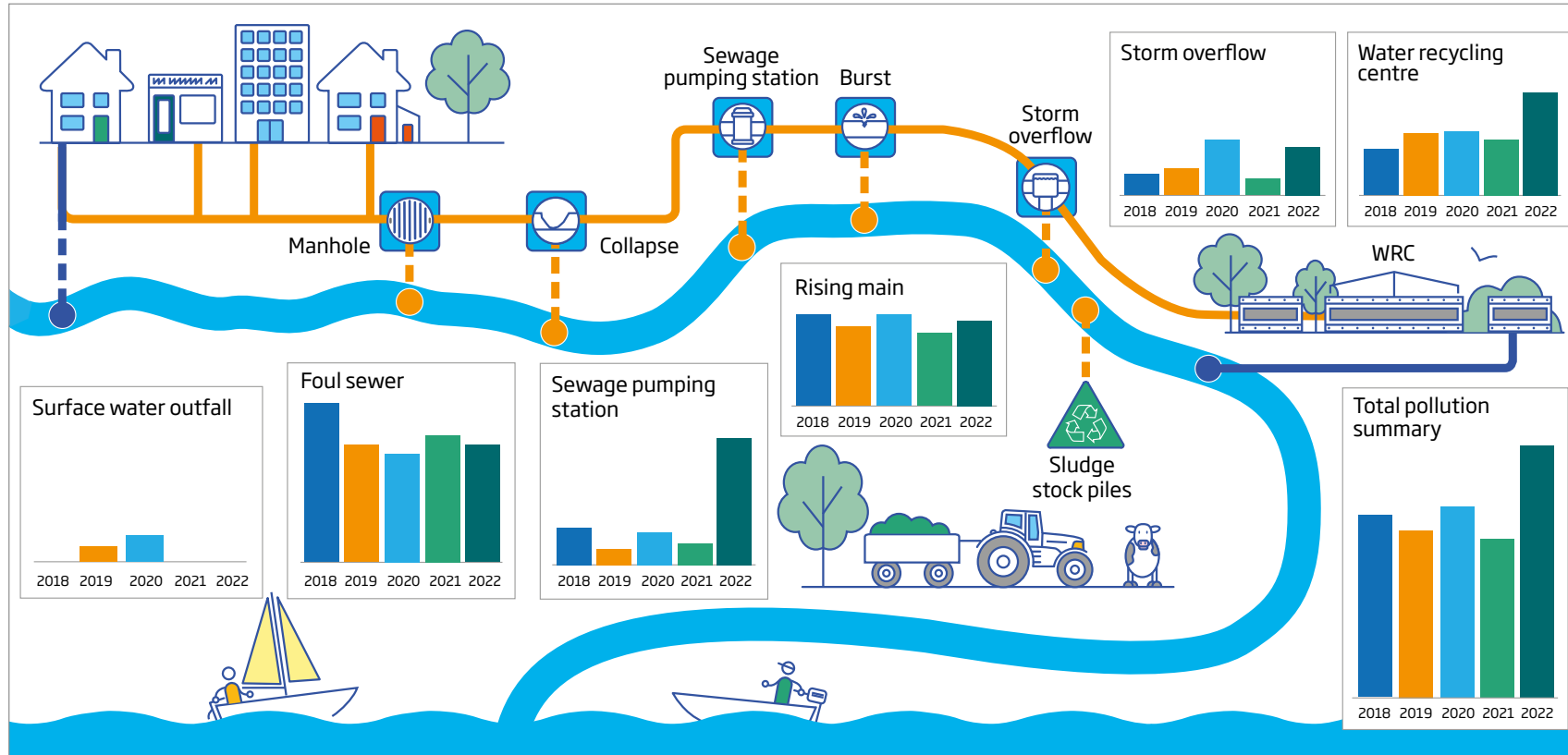


Figure 3: Wastewater pollution incidents by asset type across our sewerage system, 2018 -2022

## Root cause analysis

Analysis of pollution root causes for 2022 shows that blockages in foul sewers continues to dominate and these blockages are predominantly caused by wet wipes and cooking fat from sewer misuse.

Unlike in previous years where we have seen a marked reduction of pollutions caused by blockages, we have seen a notable increase in 2022. This increase is thought to be exacerbated by the prolonged drought followed by very heavy rain this winter.

A breakdown of blockage types shows a small increase in the number of pollutions caused by wet wipes and rag, despite the PIRP focusing on customer behaviours. We will continue this investment before we will see a substantial improvement in hotspot areas.

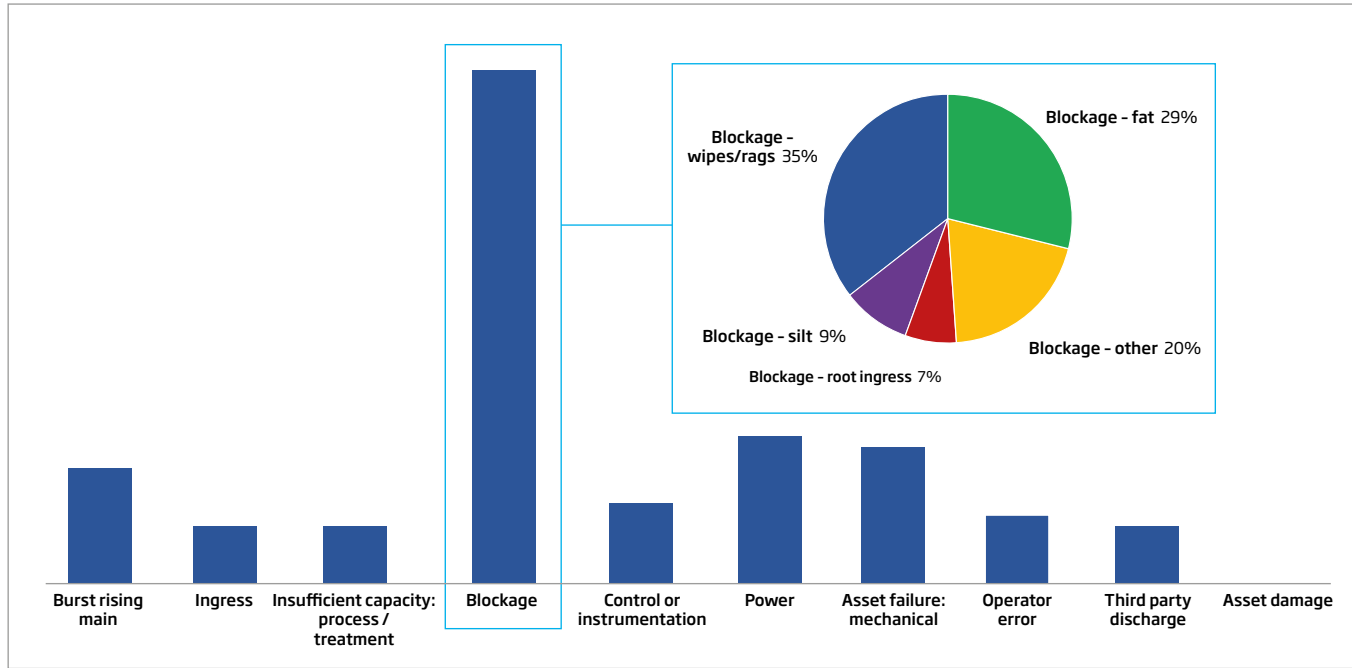


Figure 4: Root cause analysis for Cat 1-3 pollution incidents in 2022 and details of blockage causes

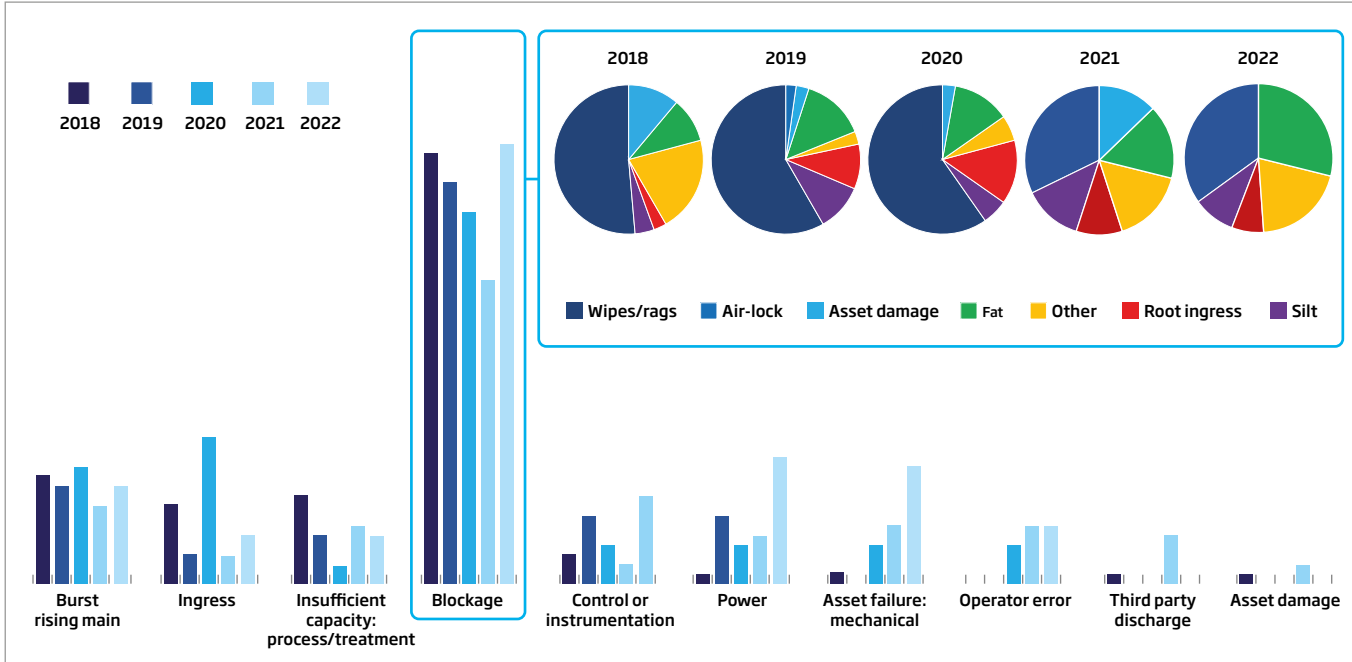


Figure 5: Root cause analysis trends for 2018 - 2021 and details of blockage causes trend



There was a notable increase in pollutions caused by blockages in 2022

## Sewage pumping station and water recycling centre focus

In 2020 when our PIRP was originally published, the greatest focus was on foul sewers as these assets had the highest number of pollution incidents. This programme has continued to provide benefits across most of our assets associated with the sewerage network.

Through 2022 two areas have seen an increase in pollution incident volumes that have led us to expand the PIRP content to focus more on both sewage pumping stations and water recycling centres. A number of activities to reduce the pollutions from these assets are within our existing plan, however, we have undertaken a new root cause analysis to make further improvements. These have been built from our existing PIRP framework of preventative actions and response, based on the four main themes:

- people and process
- assets and maintenance
- customers and stakeholders
- telemetry data and analysis.

### Sewage pumping stations

SPSs are below ground tanks or storage spaces that have electromechanical assets that then pump the sewage up an incline where gravity will not sustain a flow within a sewerage network. These can be foul sewers (carrying sewage), surface water sewers (carrying surface water and rainwater) or combined sewer systems (carrying both foul water and surface water). Within Wessex Water there are over 2,000 SPSs, these vary in size from covering a few houses to large sections of urban communities.

This year we have seen an increase in the number of pollution incidents at SPSs, particularly because of analysis of data from EDM. These EDM monitored overflows are often associated with SPSs. This increase has led us to change some of our processes:

- Cross check multiple sources of information (including EDM data) to check performance. This will make our incident response much quicker.
- Understand circumstances where spills might happen. Previously, without EDM monitoring, our technicians were unable to see a problem if it spilled in a different location i.e. somewhere else in the network. The technology now provides us with greater visibility of the interconnectivity of our assets in a real-time basis.

### Water recycling centres

WRCs are the locations where the sewage is collected from the whole catchment and then proceeds through a series of treatment stages, these are largely biological with some chemical or mechanical addition processes. These transform the sewage into clean final effluent that can be returned to the natural environment. There are 405 WRCs of varying sizes from taking the waste of a few houses to the majority of Bristol.

In a similar way to the SPS approach, we have focussed on the root causes and lessons learnt from incidents to see if actions can be enhanced to deliver further benefits specifically targeted at WRCs.

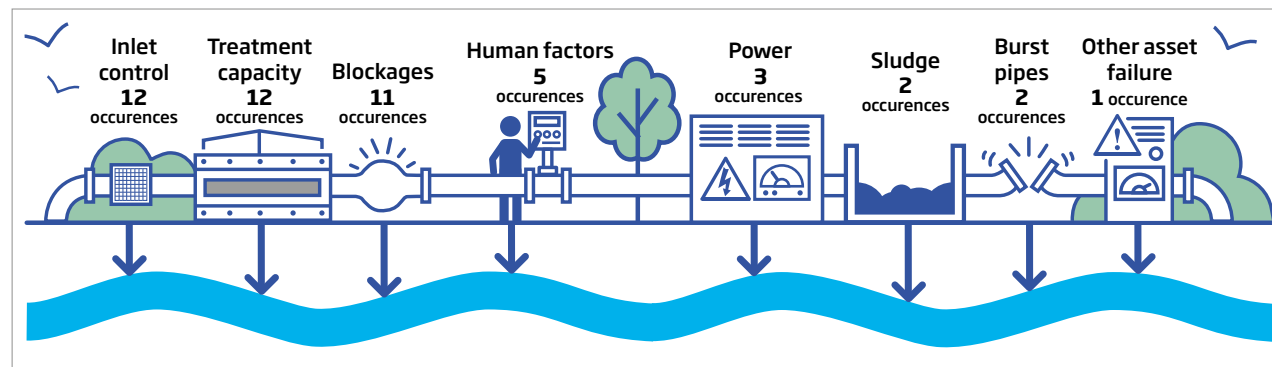


Figure 6: Assessment of root cause within WRCs

Our key areas of focus at WRCs following the review are:

- utilise and improve real-time data from our water recycling centres to allow us to make earlier interventions when sites go outside of normal operating parameters
- enhanced maintenance strategy focussed on critical assets to improve operational reliability.



*Real-time data from our water recycling centres allows us to make earlier interventions*



# Activities and performance

## Key activities

We have included a few case studies we think show the types of things that are included in our scope and have made successful changes so far.

## Network monitoring

### What have we done?

As part of our prevention workstream we have focused on additional monitoring and enhanced diagnostics, together these are demonstrated in this case study.

Over the past 12 months the network monitoring team has been set up to utilise data captured by sensors installed across our sewer network. Enhanced analysis and machine learning tools, such as StormHarvester, allow the team to interrogate and proactively resolve issues before they result in pollution and flooding incidents. Analysis principally focuses on blockages, bursts, pump operation and EDM. The team is currently averaging over 22 'good catches' per month that may have caused negative impacts to customers and/or the environment, if not for the interventions actioned by operational field teams.

The team work with multiple teams to achieve these outcomes, therefore engagement and process planning has been key to the development and success of the team.

### Lessons learnt

The key to realising 'good catches' is being able to trigger appropriate actions. Often the data can indicate a problem before anything is noticeable in the field. This can be especially problematic when rising mains have burst as impacts may not be visible/obvious at the surface. We have therefore implemented action progression plans that details follow up actions when no visible evidence of the specific location can be found.

Alongside this, as we are so reliant on data, we need to ensure that sensors/monitors are maintained and are providing reliable information. Working closely with operational field teams and the asset reliability team has been critical in ensuring we continue to have good quality data to analyse and feed into our tools.

### Future planned activities

Work is ongoing rolling out further monitors and developing the suite of analytical tools at our disposal. As more monitors are installed across the sewer network, the

team will get a better overview of how the network is operating. This will result in better insights into problems and therefore improves the quality of actions we can send out.

We are currently at the trial stage of looking into new cost-effective monitor technology available to us. This will ultimately feed into Wessex Water's Sewer Network Monitoring Strategy, ensuring we invest in the right solutions for the future.

## Burst detection

### What have we done?

Rising main burst detection and prevention is one of our prevention, data and analysis workstreams, this is demonstrated by this case study.

Over the past 12 months we have continued to deploy sensors that allow us to detect bursts on our rising mains. The methods used have been chosen to give accurate alerts of a burst on the rising main, while also providing us with data to allow for better operation and control of our assets. This forms part of our £9 million programme for burst detection monitoring of our sewerage rising main assets over the five-year investment period. The sites selected were classified using a consequence-based methodology; where rising mains have the highest consequence of causing a significant pollution these have been prioritised.

The first step in detecting bursts on rising mains is retrieving data from the assets. The second step in analysing the data to alert us to a potential (or real) burst. As the number of sensors has increased the requirement for this has continued to grow. We have deployed complex algorithms to reduce false alerts where possible, while also extending our performance monitoring. This combined with the recently formed network monitoring team has allowed for timely notification of issues and much more effective use of site-based crews.

### Lessons learnt

While the detection rate has been good, there have been some incidents where the burst or leak has been too small to show up on the sensors used.

Almost all our rising mains have the ability to cause a pollution by their nature, but greater monitoring will be required to understand and manage these assets moving forward.

## Future planned activities

We have focused on developing accurate solutions to optimise our ability to detect anomalies. Through our development we have determined that pressure sensors alone provide the greatest benefit. As this a more cost-effective solution it will allow a wider rollout across our estate.

To better understand our assets, we will be launching a Wessex Water Marketplace challenge for rising main burst detection and pumping station analytics. Some of our historic pumping station data will be made available to companies who can then use whatever tools they have available to them to find insights and anomalies in our data from our sites. This will be done in a very similar way to the intelligent sewers Marketplace challenge of 2020 and aims to identify new tools to further our work in this area.

## Commercial fats, oils and greases (FOG) programme

### What have we done?

Working with food establishments as part of our prevention, customer and stakeholder improvement workstream is demonstrated in this case study.

Since 2022 we have established a team within Wessex Water to focus on food establishments that have kitchen facilities on site, as a group these are referred to as 'food establishments'. We look to improve awareness and understanding of the impact FOG can have on their drains and on Wessex Water's sewerage network. The team have spent time visiting over 850 establishments to talk to the owners and operators about their potential impact of their operations on the network.

Lots of establishments are aware of food waste disposal but many are not aware of how much FOG they put down the drain. The team will usually discuss good FOG management, including scraping waste into food waste, not washing FOG down the sink and installation of grease traps to hold and separate the FOG from the washings before the water goes into the drains. These locations are often takeaways and restaurants, school canteens or care homes. All of these have the potential to have an impact on the network.

We have targeted areas in two ways:

- Whole towns where there are issues across the sewer catchment which ultimately build up at the water recycling centre.
- Specific locations identified through blockage clearance or inspections that show a build-up of FOG in the section of sewer. Information from blockages can pinpoint a list of possible food establishments to approach.

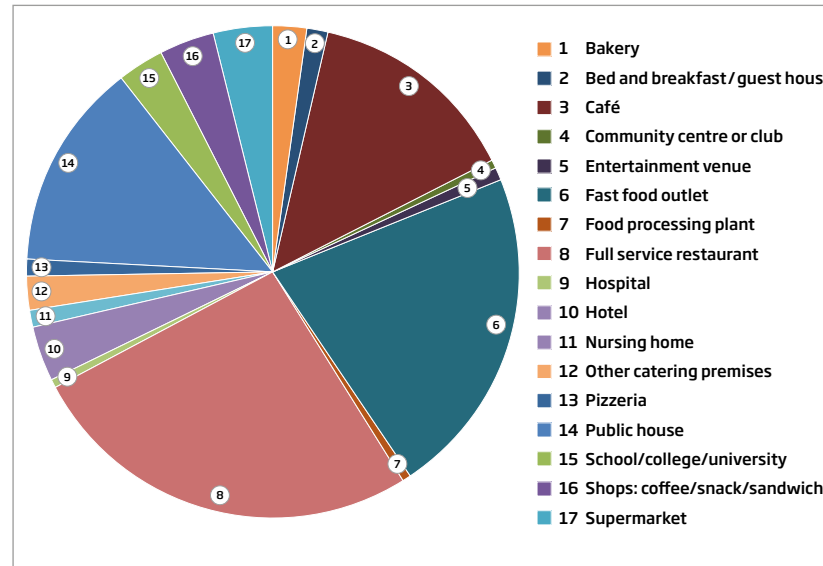


Figure 7: The types of food establishments that are engaged on our FOG reduction campaign

### Lessons learnt

Of the locations we have visited 81% are now compliant with grease traps or compliant processes. This has had a positive impact on the performance of the sewers with a reduction in overall blockages in these areas. We refer to a group of food establishments in the same section of sewer as a compliant cluster. Those locations where all establishments have become compliant with good FOG practises have demonstrated an ongoing reduction in incidents.

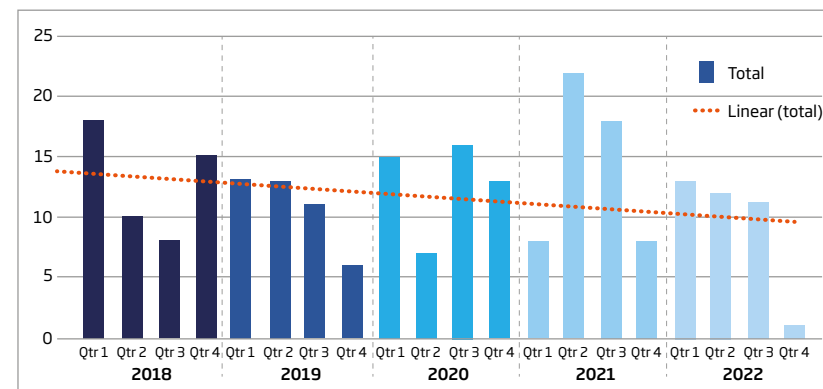
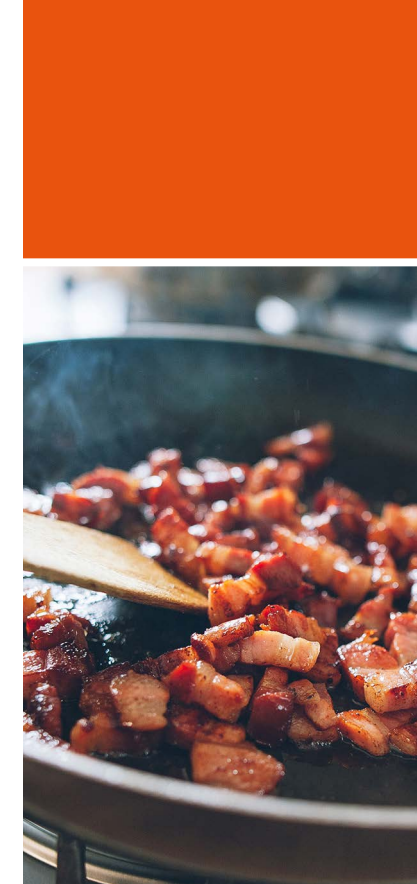
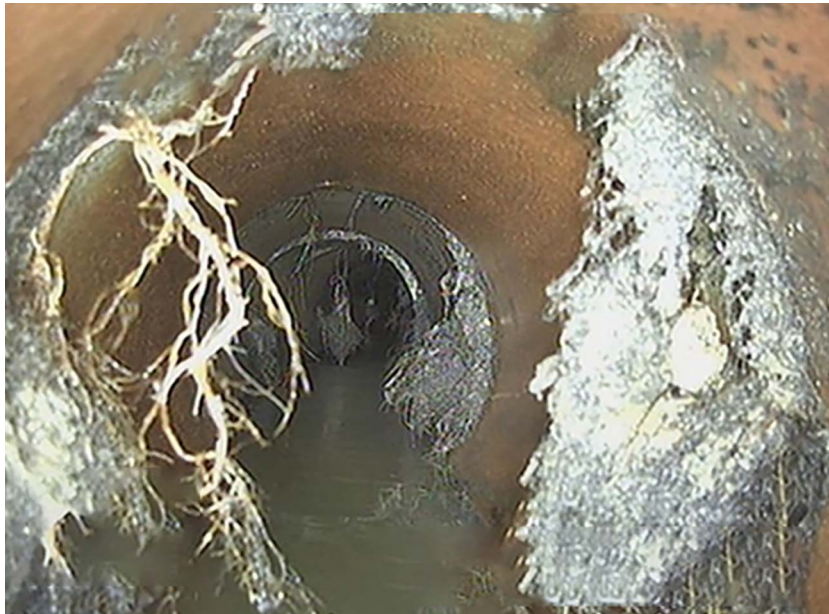


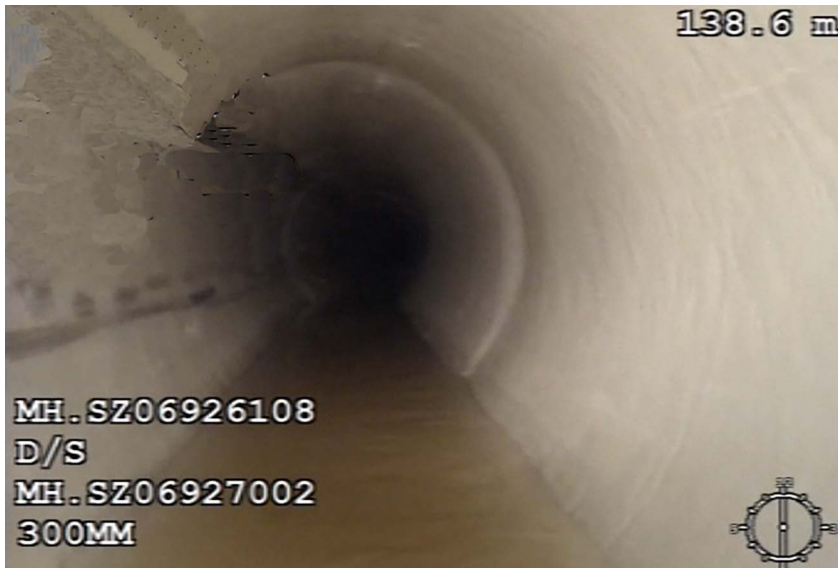
Figure 8: incident trend in cluster of FSE that are now all compliant with good FOG management practises



All food establishments have the potential to have an impact on the network



Picture from CCTV inspection



Picture following the trenchless sewer lining repair

### Future planned activities

Identifying establishments to work with is an ongoing process as new establishments are opened or change ownership and we will continue to work on continuous education.

This team are working with other water companies and the Water Research Council to introduce updated and enhanced standards for grease traps that are more exacting, which will reduce impact on sewers and make it easier for owners and operators to understand what they need to comply with and why.

### Sewer rehabilitation

#### What have we done?

As part of the prevention, assets and maintenance workstream is a focus for the catchment rehabilitation programme which is demonstrated through this case study.

Each year we identify a list of priority locations to survey using CCTV cameras to check the condition of the sewers. This prioritisation uses many factors to decide which sections we are going to take a closer look at. These include, but are not limited to, sewer age, sewer material, past performance - including number of blockages or past pollutions, proximity to sensitive areas such as rivers and environmentally sensitive locations, soil condition, food outlet density and tree cover density (due to the impact of tree roots on sewers). Following the survey, the footage is currently viewed by a person to see if there is any damage or anything else to address such as fatbergs. This manual viewing results in a condition grade being assigned for each individual length of sewer.

When a sewer has damage or detritus buildup, we will either send a crew back immediately if it is high risk or arrange for the repair in a planned programme of work. The image shows a sewer where tree roots have found the joints in the sewer pipes and have forced their way through. Tree roots can cause a restriction in the flow of sewage and cause a build-up of debris, wet wipes and / or fats resulting in even bigger blockages. This is becoming more of an issue as roots extend to try to find water during dry periods, which are becoming more frequent and for longer periods of our summers.



*Sewer lining techniques allow us to complete the work in a shorter time and with less disruption*

## Lessons learnt

We are also focusing our repairs on sewer lining techniques that allow us to complete the work in a shorter time and with less disruption to customers, as we don't have to dig trenches to gain access to our assets but make the repairs through existing manholes using trenchless technologies.

We have assessed the impact of the sewer rehabilitation by comparing before and after incident rates within the immediate area of the repair works carried out. This shows a downward trend for the number of pollutions, blockages, and flooding incidents for one year after work has been completed (compared to one year before the work was completed). This downward trend indicates an improving position within the specific area.

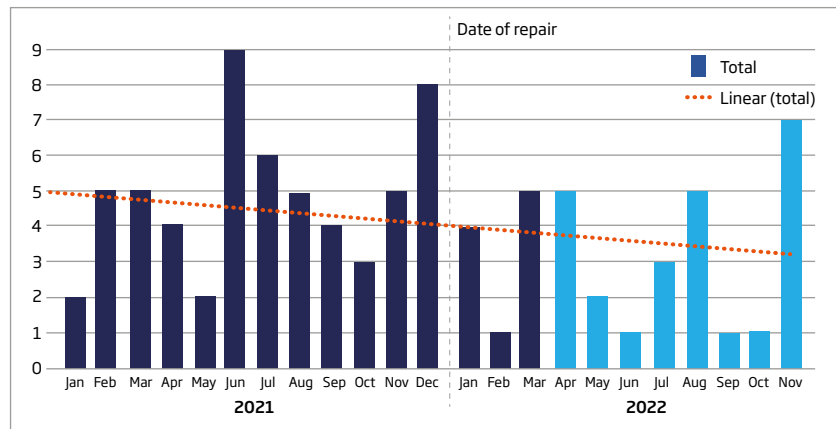


Figure 9 shows a trend in the reduction of incidents following sewer rehabilitation.



## Future planned activities

We continue to refine our risk tools which help prioritise the sections of sewer that we need to survey, and this continues to target our work in the areas with the likelihood of the greatest need. This CCTV programme will identify immediate needs, work for future programmes, areas to be monitored and sections that are operating with minimal deterioration.

We are continuing to increase the number of resources available to carry out the repairs of the sewer network. In 2022, for every 100 metres of CCTV carried out on our sewers, approximately 30 metres needed some repair work. This is an increase on previous years where only approximately 8 metres of every 100 metres surveyed needed repairs. This is in part because our risk models and prioritisation tools are constantly being improved, therefore we are getting better at identifying areas that are likely to require repairs.

We have identified a programme of work for 2023-24, work is well underway. This is predominately sewer relining and small repairs and will cover another approximate 8 kilometres. We have also identified a further 5.5 kilometres which will be delivered beyond 2024.



*We continue to refine the tools which help to prioritise and target our work in the areas of greatest need*

## CASE STUDY: STREAMCLEAN

### What have we done?

Streamclean is a key initiative within our response, assets and maintenance workstream and this case study provides some more details.

Our streamclean team focus on surface water systems, these are the specific sewers that should only take rainwater or run-off from your roof to a local stream or water course. A misconnection is where a property has connected the foul (household/commercial waste) to a surface water pipe by mistake.

A misconnection had been identified in a building in the Bristol harbour area and our streamclean team had received notification that the work to resolve it had been completed.

When streamclean attended the Bristol Harbour area, they confirmed the previous misconnection had been rectified, but also identified a new source from another building. This is a series of blocks of student accommodation, at this point in time it was thought to be one block of approximately 76 units. Each unit contained an ensuite including sink, toilet, and shower, plus communal kitchen facilities. The managing agents were served with a misconnection notice.



*Demonstration of misconnection*

Streamclean attend site with the contractor for the managing agents and demonstrated the misconnection of the foul drainage to the surface water line outside the property boundary. When the contractor completed the survey of the accommodation units, they determined it was most likely three quarters of the block which amounted to 292 units.

The managing agents had arranged an internal survey, which required access to individual rooms and removing some flooring to increase the

confidence in the assessment of the number of units misconnected and allow the surveyor to determine the potential options for remedial action.

The work to remedy the misconnection was completed with confirmation that the number of assets misconnected within the accommodation block was 231 units each including a toilet, basin and shower, plus 175 kitchen sinks.

Streamclean returned to the site confirmed the storm water line was clear with no signs of continued misconnection.

### Lessons learnt

We create a programme of investigation for surface water outfalls where we look for signs of a misconnection. The signs can include a smell of detergent, large amounts of very white foam or sanitary products. Our team are very skilled in tracing the source of these issues and issuing misconnection notices, these are letters that explain to the owner what has been found and what needs to change with a timescale for us to revisit.

We have continued to be very successful in identifying misconnections and tracing third party sources of pollutions into the Wessex Water sewers. This allows streamclean to maintain a shortlist of sites that have been identified and deal with these issues swiftly. The process also includes return visits to check the owner has rectified the problems and no other sources in the area have been identified before we can confirm the surface water line has returned to normal operation.

### Future planned activities

The future for our streamclean team comes in two forms:

- More and more of our own teams and the public are spotting where misconnections have happened, and the team will continue to keep delivering a swift and effective response.
- Some proactive checking of surface water sewers particularly near bathing water areas, even without visible evidence to be sure nothing is entering the surface water sewer that shouldn't be.



*Our streamclean team focuses on sewers that should only take rainwater or run off*

## PIRP future strategy

- We will continue with the activities within our PIRP table Figure 10, that have served to create a great foundation for our improvement plan such as policies, pollution register, training and equipment. In addition we have provided a table in appendix 3 that shows the correlation between our root cause analysis and the PIRP strategy to demonstrate the correlation between these two different ways of looking at our assets and activities.
- We are a few years into our programmes and rolling out to new areas or increasing the number of sites visited for Water Guardians, FOG management, sewer misuse, improved self-reporting, streamclean, environmental surveys, internal pollution reviews and site investigations assessments for sewerage. Together with additional monitoring, rising main burst detection and enhanced diagnostic and alarm handling.

- We continue our engagement with national and regional organisations to influence behavioural initiatives and work with the Environment Agency to ensure we continue open and honest communications.

The total number of pollutions from water recycling centres has increased in 2022. Water recycling focus will be enhanced in 2023-2024, including the current maintenance strategy for critical assets. This will proactively improve operational reliability and prevent reactive breakdowns. Also, the teams will utilise and improve real-time data from our water recycling centres to allow us to make earlier intervention when sites go out of normal operating parameters. This real-time data will help also inform investment injection and maintenance development.

Prevention					Response				
PIRP	People and process	Assets and maintenance	Customer and stakeholders	Data and analysis	People and process	Assets and maintenance	Customer and stakeholders	Data and analysis	
	Prevention policies	Sewer CCTV - sewer risk model	Water Guardians	Additional monitoring	Response policies	Site investigation assessments	Sewer misuse strategy	Internal pollution reviews	
	Pollution register	Catchment rehabilitation programme	National and regional behavioural initiatives	Rising main burst detection and prevention	Third-party environmental support	Enhanced over-pumping	Improved self-reporting	Environment Agency communication	
	Training and equipment	Enhanced asset maintenance and upgrades	Fat, oil and grease management	Enhanced diagnostics, performance analytics and alarm handling	Resource review	Streamclean	Improved customer correspondence	Environmental surveys	

Figure 10: PIRP summary activity table.



# Appendix 1 – Quarterly activity analysis

Theme	Activity (in-period unless otherwise stated)	Unit	Q1 2022	Q2 2022	Q3 2022	Q4 2022	2022 Total
People and process	Pollution incident training (cumulative since Sept 2019)	Nr	221	308	310	265	265
Assets and maintenance	Length of sewer surveyed	Km	7.06	7.07	7.19	3.12	24.44
	Sewerage investigation assessments completed	Nr	21	20	33	49	123
	Treatment investigation assessments completed	Nr	0	0	0	0	0
	Rising main assessments completed	Nr	0	0	0	0	0
	External root cause assessments	Nr	0	1	8	3	12
	Length of sewer rehabilitated	Km	0.338	0.803	1.237	0.804	3.182
Customers and stakeholders	Summer shows: number of people engaged	Nr	0	0	2,510	0	2,510
	Attendees at Open Doors events	Nr	0	108	1,377	0	1485
	Social media reach	Nr	49,309	122,284	20,372	125,469	317,434
	FSEs investigated	Nr	49	20	83	1	153
	Personalised letters following blockage incidents	Nr	19	25	8	TBC	TBC
	Water Guardians (cumulative)	Nr	106	130	153	151	151
Telemetry data and analysis	Cumulative number of intermittent overflows monitored (and % of total)	Nr	1222 (84%)	1226 (84%)	1253 (86%)	1276 (85%)	1276 (85%)
	StormHarvester: pollutions prevented	Nr	10	14	40	37	101

# Appendix 2 – Governance

Wessex Water strives to meet all environmental targets and is focused on returning to upper quartile performance in terms of both serious and total number of pollution incidents. However, our board is clear that our long-term aim must be to achieve zero pollution incidents while in the short-term reducing them to fewer than 69 incidents a year by 2025.

In order to achieve this, we have developed an internal governance framework comprising several working groups (Figure 11) and documents which follow a 'plan - do - review - act' approach (Figure



Figure 11: Wessex water internal governance framework

12). Each of these groups, which meet throughout the year, offer the opportunity for different aspects and levels of the pollution incident reduction plan to be challenged, as well as developed. This continual process allows the PIRP to be dynamic and continually evolve as data and new working practices develop. In addition to our PIRP, we have developed an internal working policy document (escape of sewage reduction plan) detailing all our initiatives and the projects associated with the reduction of flooding incidents as well as pollution reduction.

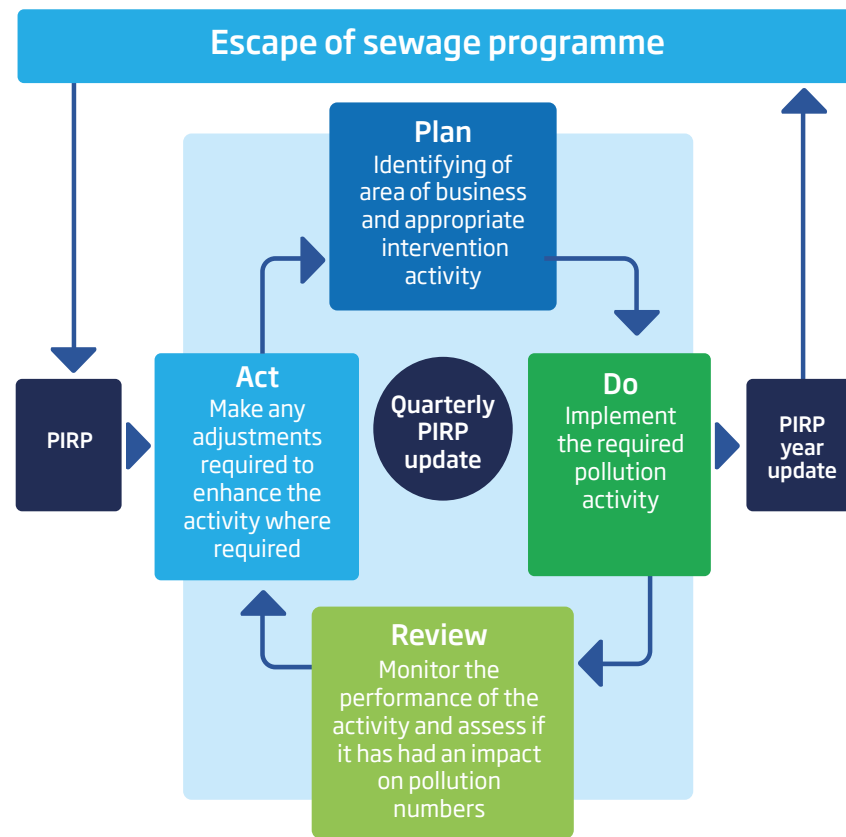
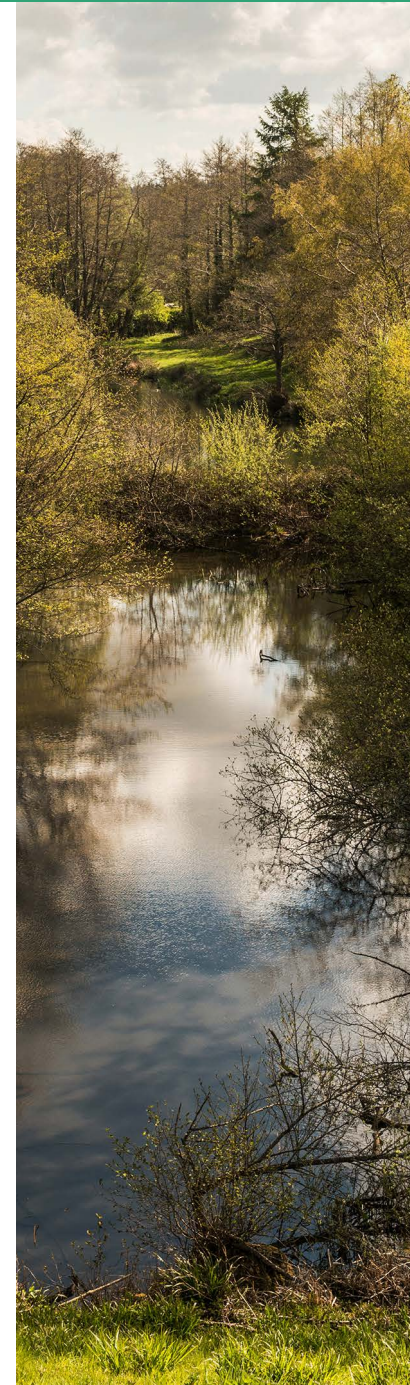


Figure 12: Overview of Wessex Water internal 'plan-do-review-act' process





# Appendix 3 – PIRP actions and root cause correlation

		PIRP actions	
Asset type	Failure mode	Prevention	Response
All	All	<ul style="list-style-type: none"> <li>• Prevention policies</li> <li>• Pollution register</li> <li>• Training and equipment</li> <li>• Water Guardians</li> <li>• Enhanced diagnostics</li> <li>• Performance analytics and alarm handling</li> </ul>	<ul style="list-style-type: none"> <li>• Response policies</li> <li>• Third party environmental support</li> <li>• Resourse reviews</li> <li>• Improved self reporting</li> <li>• Internal pollution reviews</li> <li>• Environment Agency communications</li> <li>• Environmental surveys</li> </ul>
Combined sewer overflow	Blockage	FOG management	Sewer misuse strategy
	Hydraulic overload	<ul style="list-style-type: none"> <li>• Catchment rehabilitation programme</li> <li>• Sewer CCTV - sewer risk model</li> </ul>	Site investigation assessments
	Human error	<ul style="list-style-type: none"> <li>• Training and equipment</li> <li>• Prevention policies</li> </ul>	<ul style="list-style-type: none"> <li>• Response policies</li> <li>• Internal pollution reviews</li> </ul>
	Mechanical	<ul style="list-style-type: none"> <li>• Enhanced diagnostics</li> <li>• Performance analytics and alarm handling</li> <li>• Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>• Internal pollution reviews</li> <li>• Site investigation assessments</li> </ul>
	Electrical	<ul style="list-style-type: none"> <li>• Enhanced diagnostics</li> <li>• Performance analytics and alarm handling</li> <li>• Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>• Internal pollution reviews</li> <li>• Site investigation assessments</li> </ul>
Foul sewer	Hydraulic incapacity	Sewer CCTV - sewer risk model	Site investigation assessments
	Blockage - rag	<ul style="list-style-type: none"> <li>• National and regional behavioural initiatives</li> <li>• Improved customer correspondence</li> </ul>	Sewer misuse strategy
	Blockage - fat	<ul style="list-style-type: none"> <li>• National and regional behavioural initiatives</li> <li>• FOG management</li> </ul>	Sewer misuse strategy
	Blockage - silt/grit/stone	<ul style="list-style-type: none"> <li>• Sewer CCTV - sewer risk model</li> <li>• Catchment rehabilitation programme</li> </ul>	<ul style="list-style-type: none"> <li>• Response policies</li> <li>• Third party environmental support</li> </ul>
	Blockage - roots	<ul style="list-style-type: none"> <li>• Sewer CCTV - sewer risk model</li> <li>• Catchment rehabilitation programm</li> </ul>	<ul style="list-style-type: none"> <li>• Response policies</li> <li>• Third party environmental support</li> </ul>
	Blockage - other	<ul style="list-style-type: none"> <li>• Sewer CCTV - sewer risk model</li> <li>• Catchment rehabilitation programme</li> </ul>	<ul style="list-style-type: none"> <li>• Response policies</li> <li>• Third party environmental support</li> </ul>
	Pipe failure	Sewer CCTV - sewer risk model	<ul style="list-style-type: none"> <li>• Internal pollution reviews</li> <li>• Site investigation assessments</li> </ul>

		PIRP actions	
Asset type	Failure mode	Prevention	Response
Pump station	Hydraulic overload	Additional monitoring	Site investigation assessments
	Power failure - mains / site level	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Electrical fault	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Pump blocked	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Panel/control fault	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Blockage - rag	<ul style="list-style-type: none"> <li>National and regional behavioural initiatives</li> <li>Improved customer correspondence</li> </ul>	Sewer misuse strategy
	Blockage - fat	<ul style="list-style-type: none"> <li>National and regional behavioural initiatives</li> <li>FOG management</li> </ul>	Sewer misuse strategy
	Blockage - silt/grit/stone	<ul style="list-style-type: none"> <li>Sewer CCTV - sewer risk model</li> <li>Catchment rehabilitation programme</li> </ul>	<ul style="list-style-type: none"> <li>Response policies</li> <li>Third party environmental support</li> </ul>
	Blockage - roots	<ul style="list-style-type: none"> <li>Sewer CCTV - sewer risk model</li> <li>Catchment rehabilitation programme</li> </ul>	<ul style="list-style-type: none"> <li>Response policies</li> <li>Third party environmental support</li> </ul>
	Blockage - other	<ul style="list-style-type: none"> <li>Sewer CCTV - sewer risk model</li> <li>Catchment rehabilitation programm</li> </ul>	<ul style="list-style-type: none"> <li>Response policies</li> <li>Third party environmental support</li> </ul>
	Generator failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Pump failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Rising main	Burst - rising main	Rising main burst detection and prevention
Human error		<ul style="list-style-type: none"> <li>Training and equipment</li> <li>Prevention policies</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
Equipment failure		<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>

		PIRP actions	
Asset type	Failure mode	Prevention	Response
Water Recycling Centre	Asset failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Blockage - rag	<ul style="list-style-type: none"> <li>National and regional behavioural initiatives</li> <li>Improved customer correspondence</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	Sewer misuse strategy
	Blockage - silt / stone / grit	<ul style="list-style-type: none"> <li>Sewer CCTV - sewer risk model</li> <li>Catchment rehabilitation programme</li> </ul>	<ul style="list-style-type: none"> <li>Response policies</li> <li>Third party environmental support</li> </ul>
	Blockage - WRC inlet	<ul style="list-style-type: none"> <li>Sewer CCTV - sewer risk model</li> <li>Catchment rehabilitation programme</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Response policies</li> <li>Sewer misuse strategy</li> <li>Third party environmental support</li> <li>Internal pollution reviews</li> </ul>
	Burst - rising main	Rising main burst detection and prevention	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Electrical fault	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Equipment failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Failing FFT or PFF	Enhanced asset maintenance and upgrades	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Flooding / runoff	Prevention policies	Response policies
	Generator failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Human error	<ul style="list-style-type: none"> <li>Training and equipment</li> <li>Prevention policies</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Hydraulic overload	<ul style="list-style-type: none"> <li>Additional monitoring</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Site investigation assessments</li> </ul>
	Lack of capacity	<ul style="list-style-type: none"> <li>Additional monitoring</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Site investigation assessments</li> </ul>
	Mechanical fault	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	Other	Prevention policies	Response policies

		PIRP actions	
Asset type	Failure mode	Prevention	Response
Water Recycling Centre (continued)	Panel/control fault	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Pipe collapse	<ul style="list-style-type: none"> <li>Additional monitoring</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Pipe failure	<ul style="list-style-type: none"> <li>Additional monitoring</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Power failure - mains / site level	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Pump blocked	<ul style="list-style-type: none"> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Pump failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Structural failure	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	Unauthorised discharge	<ul style="list-style-type: none"> <li>National and regional behavioural initiatives</li> <li>National and regional behavioural initiatives</li> </ul>	Response policies
	Unknown	Prevention policies	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Enhanced over pumping</li> </ul>
	WRC process	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>
	WRC process - cold weather	<ul style="list-style-type: none"> <li>Additional monitoring</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> <li>Environment Agency communication</li> </ul>
	WRC process - poor quality effluent	<ul style="list-style-type: none"> <li>Enhanced diagnostics</li> <li>Performance analytics and alarm handling</li> <li>Enhanced asset maintenance and upgrades</li> </ul>	<ul style="list-style-type: none"> <li>Internal pollution reviews</li> <li>Site investigation assessments</li> </ul>

		PIRP actions	
Asset type	Failure mode	Prevention	Response
Storm tanks	Human error	<ul style="list-style-type: none"> <li>• Training and equipment</li> <li>• Prevention policies</li> </ul>	<ul style="list-style-type: none"> <li>• Internal pollution reviews</li> <li>• Site investigation assessments</li> </ul>
	Blockages	Additional monitoring	<ul style="list-style-type: none"> <li>• Internal pollution reviews</li> <li>• Site investigation assessments</li> </ul>
Water distribution	Burst water main	<ul style="list-style-type: none"> <li>• Enhanced diagnostics</li> <li>• Performance analytics and alarm handling</li> <li>• Enhanced asset maintenance and upgrades</li> </ul>	Response policies
Water treatment	Supply incident	<ul style="list-style-type: none"> <li>• Enhanced diagnostics</li> <li>• Performance analytics and alarm handling</li> <li>• Enhanced asset maintenance and upgrades</li> </ul>	Response policies

# Glossary

<b>AMP7</b>	The seventh asset management period planned by the UK water industry and running from 2020 to 2025.
<b>Category 1 pollution incident</b>	Major, serious, persistent and/or extensive impact or effect on the environment, people and/or property.
<b>Category 2 pollution incident</b>	Significant impact or effect on the environment, people and/or property.
<b>Category 3 pollution incident</b>	Minor or minimal impact or effect on the environment, people and/or property.
<b>Category 4 pollution incident</b>	No impact on the environment.
<b>EDM</b>	Event Duration Monitor.
<b>eNGOs</b>	Environmental non-governmental organisations.
<b>FOG</b>	Fat, Oil and Grease.
<b>GIS</b>	Geographic Information System.
<b>HLA</b>	An assessment of flooding incidents to establish the underlying cause, producing high level solutions with cost estimates.
<b>Ofwat</b>	The water services regulation authority.
<b>PIRP</b>	Pollution incident reduction plan.
<b>PR24</b>	Ofwat's Price Review 2024.
<b>Rising main</b>	A rising main is a sewer which is pressurised, using pumps to move sewage uphill.
<b>SPS</b>	Sewage pumping station.
<b>WRC</b>	Waste water recycling centre.

