Pollution Incident Reduction Plan

September 2020

United Utilities

Water for the North West

Foreword

We proudly supply clean water to over three million homes and remove wastewater for treatment 24 hours a day, 365 days of the year.

This work carries on without any issues the vast majority of the time. Occasionally, pollution incidents do occur and I am committed to our long-term ambition of eliminating these.

Strong performance starts with having the right culture and the situational awareness of how the system is operating within the environment we endeavour to protect and enhance.

I'm pleased that we have a strong track record of high levels of self-reporting of pollution incidents to the Environment Agency. However, we are not resting on our laurels and on the back of installing widespread monitoring on our sewer network we are driving towards very high levels of self-reporting of incidents. This is important because early awareness of issues allows us to significantly limit the impact of any incidents that do occur.

Allied to this, we have driven the level of serious pollution incidents down to record lows in recent years and we will work hard to sustain this performance. This means that our key focus is on reducing the number of less serious pollution incidents and this plan is aimed at delivering improved performance in this area.

The job of eliminating pollution incidents is complex, as we have little control of over what enters the sewer network. As a result, we will step up our efforts to work with domestic customers and businesses to help them to understand how they can use our services in a way that reduces the risk of blockages occurring due to materials such as wet wipes and fat which accumulate in the sewers. This is important because blockages are the single biggest cause of pollution incidents and wipes are the key contributory factor.

Alongside this, our plan will target sustaining our strong culture around eliminating pollution incidents, driving for maintenance excellence and embedding our systems thinking approach. This plan and the actions contained within it have received the endorsement of the Board who will review performance and action delivery annually to ensure it is on track.

Steve Mogford
Chief Executive Officer

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Executive summary

United Utilities is privileged to serve the people and environment of the North West. Over three million homes and 200,000 businesses depend upon us each and every day.

We commit to being a transparent, resilient provider of high quality, value for money water and wastewater services. What we do every day is fully integrated with the environment; we take water to produce drinking water and then recycle wastewater before safely returning it to the environment. The role we play in the water cycle and the footprint we leave is something we take extremely seriously and reducing pollution, trending towards zero, is our goal.

We are pleased to present our Pollution Incident Reduction Plan that will drive towards the stretching targets we have set ourselves:

- **Building on a strong track record**
  We have achieved zero serious pollution incidents in 2019, delivered over 33% reduction in incidents since 2012, and have a track record of exceeding targets for self-reporting incidents.

- **Targeting stretching service levels for customers and environment**
  From an industry leading position we are targeting further reduction in incidents by 2025 and innovating to go further to be green under the revised Environmental Performance Assessment carried out by the Environment Agency.

- **Embedding a zero pollution tolerance**
  We have robust processes and a strong environmental stewardship culture. However, we are also conscious that this may not always be consistently applied. Actions in this plan will drive improvements in process and culture across the organisation.

- **Delivering for the long term**
  25 year planning through our Drainage and Wastewater Management Plan will give us and stakeholders the clearest view we have ever had of risk and opportunities to drive down pollution.

- **Building on systems thinking**
  Actions to facilitate a forward shift in technology capability, production line thinking and awareness of the environment within which we operate.

- **High levels of governance and trust**
  Responsible reporting structure to ensure all levels of the organisation have visibility of pollution performance and actions to drive performance.

This document sets out our ambition to deliver a step change in pollution performance for customers and the environment of the North West to 2025 and beyond.

1. Introduction

Over the last two decades we are proud to have played a pivotal role in improving the quality of water in the rivers, streams, lakes and coasts of the North West. We have invested significantly in the large and complex system that provides essential services to the people and businesses in the region. As a result of that investment we are pleased to have contributed to substantially reducing the number of pollution incidents, but we want to do more.

Looking to the future we are faced with additional pressures on both our infrastructure and the environment from climate change, population growth, and development as well as consumer trends.

Climate change brings particular challenges as it could lead to impacts such as intense rainstorms overloading our systems leading to more regular overflow operation and warmer watercourses with lower levels of flow in the summer impacting on the ability of watercourses to cope with discharges.

In terms of population growth and development, the most sustainable way to adapt is to prevent further surface water entering our sewerage system and where possible remove existing surface water, particularly when areas are regenerated.

In terms of consumer trends, the widespread use of wet wipes has presented particular challenges to sewerage and treatment systems as they are resistant to breakdown and can form substantial blockages.

We have been working across the industry to tackle this issue at source by working on a standard for a flushable wipe which is starting to yield results with more sewer friendly products coming to the market and we regularly run customer education campaigns on what's safe to flush.

We serve three million homes in the North West, 24 hours a day, 365 days a year, providing drinking water and removing wastewater to recycle it before we return it to the environment. The vast majority of the time this runs very smoothly, however, occasionally, pollution incidents occur.

We're committed to driving continual improvement in this area to bring this down to an absolute minimum. This plan sets out how we have achieved the improvements seen in the period up to 2019, the challenges that we face as we move forward and the future improvements that we will make as we strive towards zero pollution incidents.

This plan requires us to work effectively in partnership with customers, other infrastructure and service providers, as this a challenge we cannot meet on our own.

2. Our past performance

We have made significant improvement in our pollution performance over the last five years. Improvements in our operational practices and incident review process have led to a significant reduction in the number of events and have resulted in industry-leading performance for serious pollution incidents and consistently strong performance for self-reporting of incidents. Although we have made progress in reducing the number of pollution incidents, we are committed to reducing the impact that we have on the environment and reducing pollution events.

As we finalised our plans for the investment period 2015 to 2020 we set our ambition and targets to align to the expectations of the Environment Agency. The Environment Agency's expectations were outlined in a letter from Dr Paul Leinster, the Environment Agency's CEO, in August 2013.

The specific expectations regarding pollution performance outlined by the Environment Agency in 2013 were are as follows:

- A reduction in category 1 and 2 pollution incidents, trending towards zero by 2020. There should be at least a 50% reduction compared to numbers of serious incidents recorded in 2012.

- A trend to minimise all pollution incidents (category 1 to 3) by 2020 with at least a third reduction compared to 2012.

- High levels of self-reporting of pollution incidents with at least 75% of incidents self-reported by 2020.

As we close the five-year investment period ending March 2020, we are reflecting on our successes, learning the lessons and finalising plans to meet the challenges of the next five years.

Since 2012, we have reduced the total number of pollution incidents category 1, 2 and 3 by over one-third and we have an industry leading position for serious pollution incidents (category 1 and 2).

Figures 1 and 2 on the following page show how the number of incidents have changed over time. While we have made significant improvements in our processes, which is reflected in our performance, more remains to be done to reduce the risk of future pollution events.

Serious pollution incidents

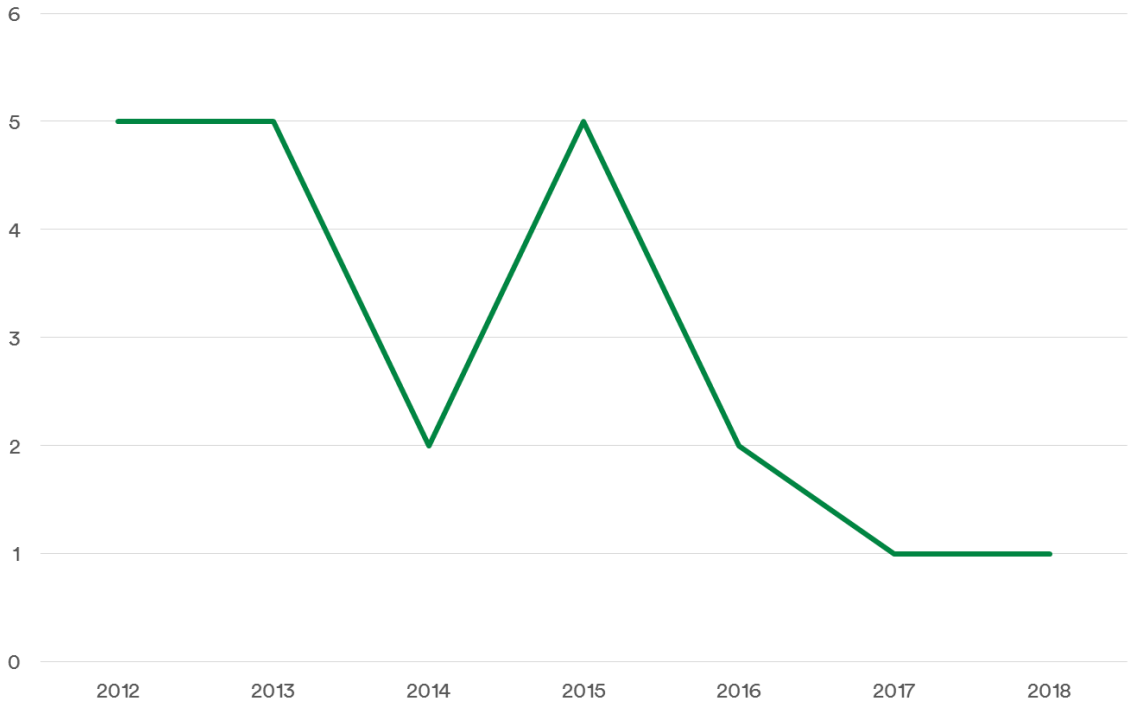


Figure 1: Category 1 and 2 pollution incidents (2012–2018)

All pollution incidents

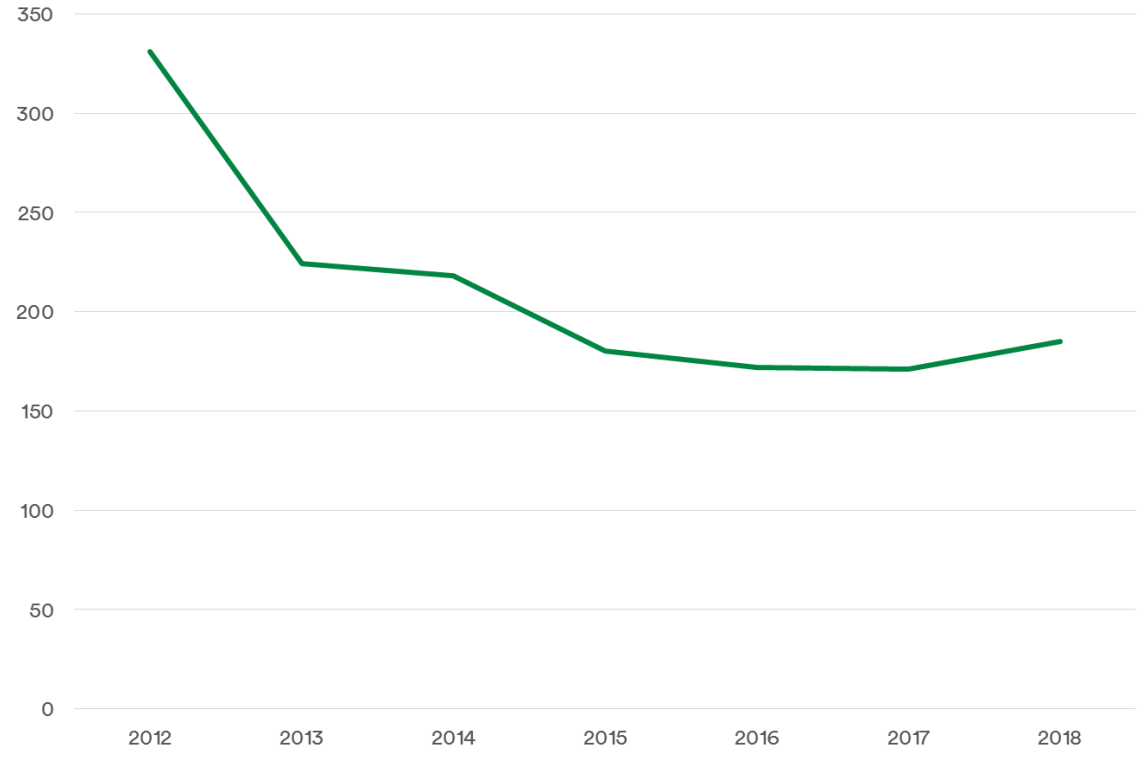


Figure 2: Category 1–3 pollution incident performance (2012–2018)

We manage risk on our system every day and when things do go wrong we are quick to act and report these incidents to the Environment Agency. Our self-reporting percentage is an area where we have made great improvements and we are keen to improve it still further over the next five-year period. As we close out this five-year plan, we can report a track record of exceeding targets for self-reporting incidents.

We set ourselves three pollution reduction and reporting goals that we wanted to achieve in the period 2015–20. The information above demonstrates how we have delivered on all commitments and pushed ourselves further.

From the three criteria of success that were set five years ago, we have achieved all elements:

	Environment Agency expectation for 2015–2020	Performance by 2019*
1.	Reduction in category 1 and 2 pollution incidents, trending towards zero by 2020. There should be at least a 50% reduction compared to numbers of serious incidents recorded in 2012	Zero achieved in 2019
2.	A trend to minimise all pollution incidents (category 1 to 3) by 2020 with at least a third reduction compared to 2012	37% reduction
3.	High levels of self-reporting of pollution incidents with at least 75% of incidents self-reported by 2020	90%

*Provisional data, subject to Environment Agency and United Utilities governance and reporting for 2019 data

In 2020 and beyond, we will deliver further improvements to our pollution performance and will learn from the past to inform and enhance our actions going forward.

3. Our targets to improve performance

It is our strategy to deliver a reduction in pollution incident performance over the next five years, and we have set a longer-term ambition to eliminate pollution incidents that occur from our activities.

Our improvement plan is underpinned by a stretching performance commitment that we declared in our PR19 business plan.

Delivery of this plan and these targets will result in us achieving our best ever pollution performance. Our performance commitment is shown in the table below:

	2020	2021	2022	2023	2024
Pollution incident target per 10,000 km of sewer	24.5	23.7	23	22.4	19.5

The performance level shown in the table above is normalised by the length of sewer. This allows our customers and regulators to compare performance across the water industry. Failure to meet the targets shown above will result in a financial penalty. Further details of this performance commitment and the incentive mechanism can be found in our 2019 business plan.

To achieve this level of performance will require a significant amount of work and investment. How we will achieve this over the next five years can be found in section 5.

Further to our performance commitment, the Environment Agency has set out their vision for the Environmental Performance Assessment (EPA) which is currently under consultation. The EPA is used to implement the Environment Agency's Water Industry Strategic Environmental Requirements (WISER) and sets targets for the water industry on key environmental measures such as pollution. Current thinking indicates that to achieve 'good' pollution performance in the EPA for the next five years we will need to achieve fewer than 17 incidents per 10,000 kilometres of sewer. This target is more stretching than our committed target through our business plan, however we will make every effort to work with the Environment Agency to strive towards their enhanced targets.

In preparing for the challenge of these targets over next the five-year period, we have assessed our strengths, weaknesses, opportunities and threats to performance. This SWOT analysis will help shape our next iteration of the pollution reduction plan.

4. Strengths, weaknesses, opportunities and threats

We have made significant improvements to our operational practices and incident review processes over the past few years. These successful approaches have resulted in United Utilities being classed as a frontier or upper quartile water company for pollution incident performance. However, we know there is significant room for improvement to meet the stretching targets for 2025, and to continue the trend toward zero pollution incidents.

In developing our action plan we have undertaken an analysis of our strengths, weaknesses, threats and opportunities in relation to pollution performance. Figure 3 below outlines how we will tackle our weaknesses and threats as well as building on strengths so that we are in position to take the opportunities:

Strengths

- Self-reporting at AMP7 green status for EPA
- Industry leading performance for serious pollution
- IComply app gives easy access to permit requirements on the move
- In house resources manage pollution risk and attend incidents, which drives a strong culture to tackle pollution
- Training embedded to ensure staff know their permits and how to respond to pollution incidents
- In house UU resolution vehicles, fully equipped to attend network incidents and proactively investigate risks
- Lead and supported knowledge sharing exercises as a leading company and also benchmarked with others
- Triage team monitor live alarm traffic to protect the environment, 24/7 spill monitoring roll out will be completed in AMP6 giving better visibility of performance
- In depth analysis of pollution performance reviewed monthly across wastewater teams
- Internal Pollution Incident Reviews held for pumping stations, wastewater treatment works and water asset related pollution incidents
- Pre-season asset checks carried out prior to bathing season
- Pollution risks are captured in corporate systems for investment prioritisation
- Water Treatment Works site drainage plans and tank integrity checks

Opportunities

- Lessons learnt from incidents are held locally rather than centrally
- Pollution Incident Reviews and training currently inconsistent
- Consistency of approaches – in areas of the business where we have historically had fewer incidents our processes need to mature

Weaknesses

- Improve visibility of lessons learnt by centralising the process and sharing best practice, sharing in management meetings and cascading to relevant business areas
- Roll out of spill monitoring gives opportunities to be more proactive in identifying pollution risk
- Enhance the in depth analysis of pollution performance for water
- Embrace System Thinking to deliver technological, people and process improvements
- Tableau Dashboard for hot spot areas and trend analysis
- To improve the risk of blockages; work with food establishments to reduce fats and oil disposal to drain
- Work with customers to raise awareness of items that should not be flushed and improve blockage risk

Threats

- Staff turnover and loss of knowledge over time
- The number of non UU pollution incidents we attend which divert resources
- Reliability of third party electricity supplies
- Non flushable material entering sewer networks leading to blockages
- Climate change exacerbating the rainfall levels we experience in the NW
- Increasing likelihood of prolonged dry weather leading to increased risk of high consequence incidents
- Population growth
- Increasingly building over green spaces leading to increased surface water runoff into sewers

Figure 3: SWOT analysis for Pollution Incident Reduction Plan

Throughout the last investment period we have undertaken a variety of activities to reduce the number of pollution incidents. Using the SWOT analysis we will learn from our previous actions and identify areas where we can develop. This has informed the development action plan for further reducing the number of pollution incidents, which can be found in the appendix. All actions can be found at the end of this document in section 13. These actions span a wide range of areas from culture, managing third party risks to long-term planning. Some of the key strategic initiatives that will support our ambition to significantly reduce the number of pollution incidents are described in the following sections.

5. Causes of pollution incidents

The Environment Agency is the environmental regulator and they categorise pollution incidents based on their severity. Serious pollution incidents are those categorised as 1 or 2, due to damage to the local environment leading to threat wildlife and in the worst cases putting the public at risk. Category 3 incidents, whilst less significant, still have a minor impact on the environment, people or property, with only a limited or localised effect on water quality. Category 4, whilst they are registered as a pollution incident, have no impact.

We have analysed the breakdown of our pollution incidents from 2012–2018 (Figure 4) to determine which part of our business they have originated from. This information then supports prioritisation of interventions, including investment, training and process improvements. The vast majority relate the wastewater side of the business due to the potentially polluting nature of sewage and the frequent connectivity with the water environment.

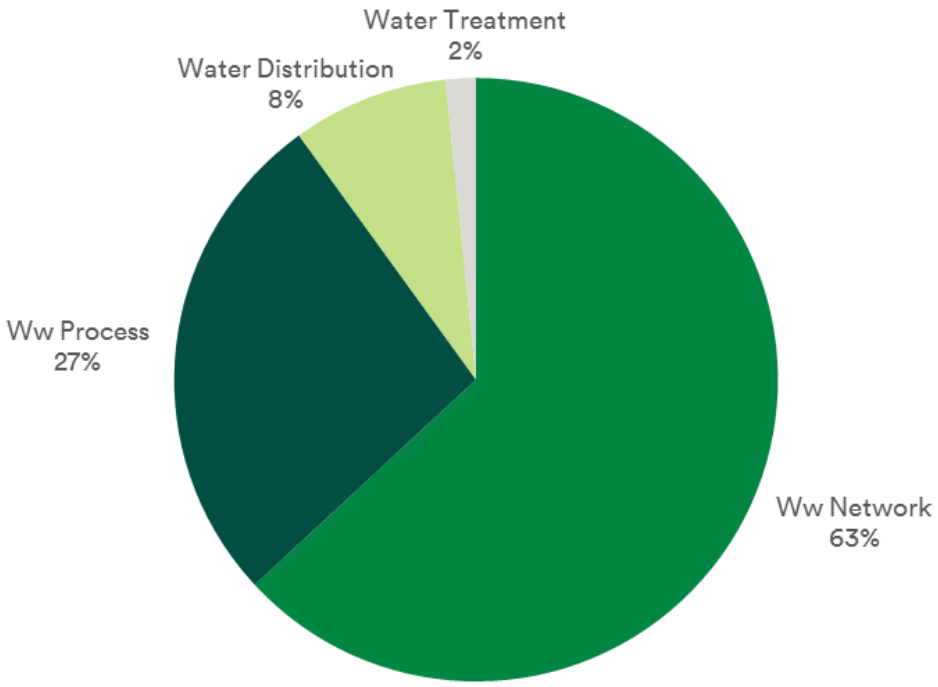


Figure 4: Source of category 1, 2 and 3 pollution incidents by business stream (2012–2018)

We manage a wastewater network which includes 77,000 kilometres of sewers that carry the wastewater for the North West as well as over 2,000 overflows that are designed to relieve pressure on the system in periods of heavy rainfall. These normally operate in line with the Environment Agency's requirements under a permit and are key to managing the risk of flooding of customer properties.

The sewer network is not a closed system and we have little control over what enters it

other than trade effluent, as developers have a right to connect. There are many routes for surface water run off to enter and we cannot control what customers choose to put down the drain. All this means that this part of the business is at the front line of the impact of rainfall and climate change as well as the risk of blockage from thousands of wet wipes and other items that unfortunately get flushed every day.

After our wastewater network the next highest proportion of pollution incidents is from wastewater treatment. These assets include wastewater treatment works and the final pumping stations and overflows before the treatment works. These assets also have overflows that can operate in periods of heavy rainfall. These are designed to control the flows to the treatment works as well as protecting customer properties from the risk of flooding in adverse weather as a result, these overflows are our second highest area of risk.

Water treatment and distribution represent a smaller proportion of our pollution risk as these parts of the business generally do not have discharges to the environment. However, we recognise the risk of serious pollution incidents if things do go wrong from this part of the service we provide.

Chemicals used in producing and distributing drinking water are harmful to the environment and are carefully managed. Bursts from water mains can also cause silt to be washed into rivers in the most extreme cases.

As the wastewater part of our business is the dominant source of incidents we have further broken down the data to show the root causes of these incidents. This helps to highlight priority areas for action to minimise the risk of further incidents. The root cause of pollution incidents from our wastewater service is outlined in Figure 5 below:

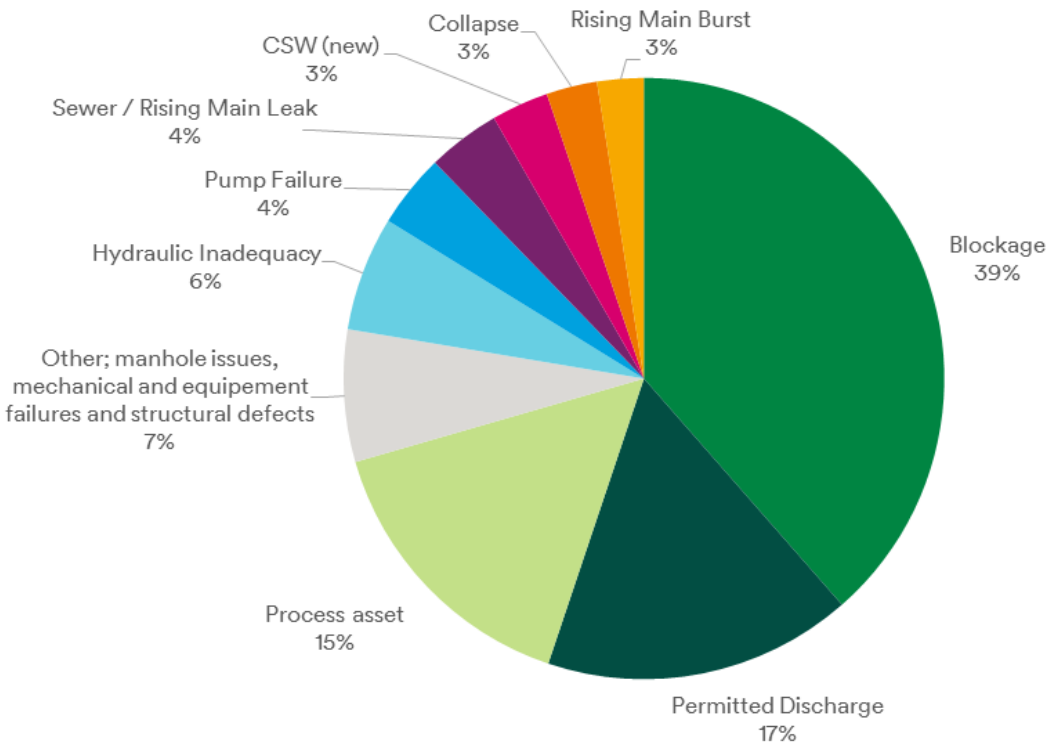


Figure 5: Source of category 1–3 pollution incidents (2012–2018)

Blockages, permitted discharges and discharges from treatment assets account for over 70% of all pollution incidents since 2012. Blockages are the most common cause and make up 39% of all pollution incidents.

Blockages are largely caused by wet wipes, tree roots, fats, oils and greases along with other materials which should not be disposed of via the sewer. The breakdown of the blockage root causes can be found in Figure 6 below:

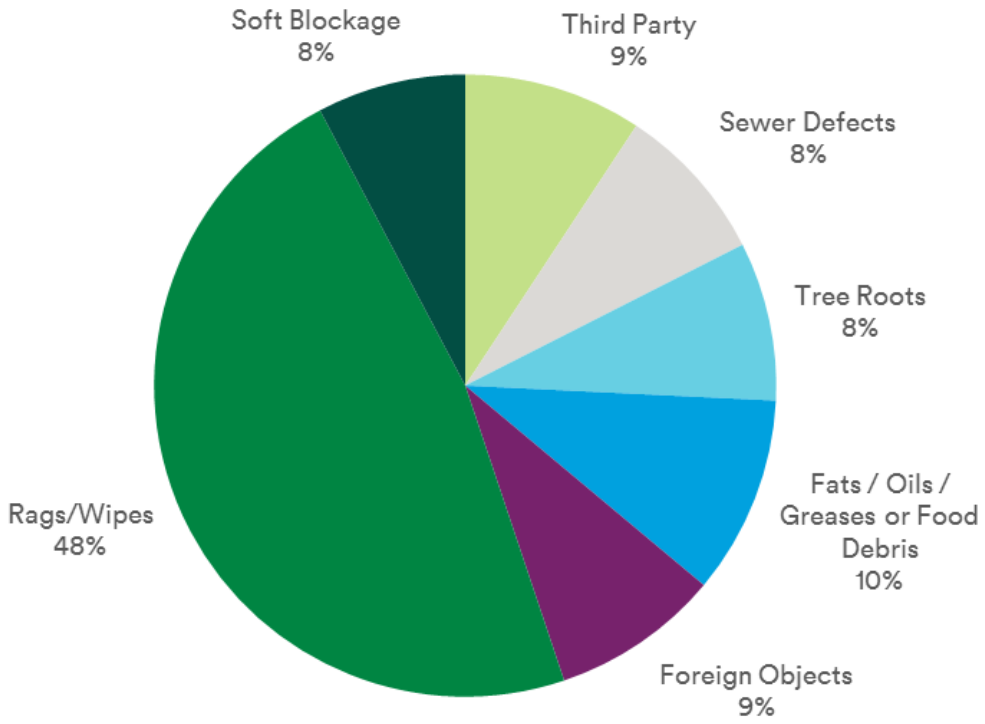


Figure 6: Blockage Root Cause Analysis (2012–2018)

Over 70% of all blockages that result in pollution incidents are caused by the actions of others; for example the flushing of wipes or the pouring of fat down the drains. In order for us to reduce the number of pollution incidents we will need to focus on reducing the number of incidents caused by customers and third parties through engagement campaigns and customer awareness programmes.

Treatment assets are the next highest cause of incidents, these include wastewater treatment works as well as the overflows and pumping stations associated with them.

These assets are critical in the recycling of water so it can be returned back to the environment. Sometimes these assets can fail which may lead to a pollution event. At our central control centre we continually monitor activity at these sites so we are able to predict when an incident might occur and provide a quick response to prevent a pollution incident or reduce the impact of an incident once it has occurred.

The next highest root cause is permitted discharges. Overflows form an integral part of the wastewater system that are designed to operate in periods of heavy rainfall.

These can relieve pressure on the system as agreed in permits with the Environment Agency, so while these overflows can operate as per permit with the Environment Agency, they still can cause pollution incidents, which are our second highest root cause for the period 2012 to 2018.

Throughout AMP6 we have installed over 2,000 event monitors, which will enable us to monitor the performance of our system and inform our strategic direction as we start to gather information from these monitors.

Action 012 in section 13 of our Pollution Incident Reduction Plan will help to mitigate the risk of permitted pollution incidents through working with electricity suppliers to understand our wider resilience and minimise the risk of power loss. **Action 006** in section 13 will promote analysis of our spill data to understand trends, root causes of spills and to share lessons learnt with the wider business. We will also specifically carry out investigations at 195 overflows to determine the root cause of their frequency of operation and to assess whether there are cost beneficial options to reduce the frequency.

6. Our approach for pollution reduction

In this section we will outline how we have achieved industry-leading performance, and then how we aim to build on this to deliver further improvements that are set out in our plan.

This plan for pollution incident reduction is built on a strong track record of delivery over the past 10 years. The learning and experience we have gained is supporting a depth of understanding of our strengths that we can build on, but also weaknesses we are aware that we will address. Tackling issues head on and building on our strengths will drive further improvements that we aspire to in this plan, as well as our longer-term strategy to eliminate pollution incidents.

Our plan is built around a strategy that comprises three pillars:

1. **Systems thinking**
   Looking at what we do and how we interact with customers and the environment as one interdependent system. Understanding the interactions between our assets and how a change to the performance of an individual asset or system component can have an impact on another component of the system or of the system performance.

2. **Culture and capability**
   As part of our system thinking approach, how our people behave and are trained is vital to the success of this plan. A focused approach to managing pollution has driven success to date and this is a strength we will share and build on to deliver the ambition of this plan.

3. Source control

Whilst we don't have full control over what enters the sewer network we can work with customers to help them understand the impact of what they flush down the toilet or pour down the drain and the huge influence on the performance of the drainage system and in-turn the level of pollution risk we manage. Because of this critical relationship between pollution incidents and customer behaviour we are building on key learnings from pilots and embarking on a significant programme of raising awareness across the customer base.

6.1. Systems thinking

The adoption of systems thinking is at the heart of our AMP7 innovation strategy. Systems thinking is an underpinning principal whereby every component of a system, and the interactions of every component is understood. Systems thinking recognises that a change in one part of the system will affect another part of the system in a predictable way. The ability to understand how a system will behave under certain events may create opportunities and enable us to understand the impact of our decisions and actions.

Ahead of AMP6 we set out to re-imagine how we could deliver operational performance to meet the scale of the service and efficiency challenges we would face in AMP6. We started thinking of water and wastewater services as one system; we took a full end-to-end approach to optimising our service delivery through additional monitoring and improved data quality, the availability of system performance data, and the right tools and management systems in place to enable an appropriate response to incidents.

We believe that maturing systems thinking capability will deliver further customer benefits, including pollution reduction. Below are examples of activities that we have been developing and maturing to improve implementation across the business and to maximise the benefit. Development in this area will optimise the central monitoring of the entire system and enable a more co-ordinated approach to delivering improvements in our pollution performance.

Alarm Triage

What have we done?

Throughout AMP6 we have had an alarm triage process in our Integrated Control Centre (ICC) whereby operational managers review incoming alarms against trends, forecasts, and weather patterns. The triage team then optimise the system performance based on the results of a root cause analysis and improve future asset performance. Prioritisation of alarms and operational responses in this way has led to a better understanding of the system and a more efficient approach to managing our responses.

What will we do?

Following the successful alarm triage trial in AMP6 we are embedding this thinking and process going forward into AMP7, these changes will provide a better understanding our the broader system and the way it reacts to other events that would otherwise not be identified.

Training

What have we done?

When responding to an incident, our staff are trained to minimise the impact of the pollution and to apply the appropriate measures to ensure the environment is protected. For every pollution incident that is attended by one of our staff, the responding personnel captures detailed information about the incident which is reported to the Environment Agency. All staff are trained to follow a reliable and accurate reporting process which can then be used in root cause analysis.

What will we do?

To maintain this level of performance, refresher training is essential to all appropriate personnel. This training will promote the correct operational practices and will be used when capturing data to ensure the correct classification of pollution incidents. Refresher training is a fundamental part of our pollution incident reduction plan for all business areas. **Actions 001 to 003** in section 13 will ensure that our staff are trained to respond to a pollution incident and report details of the event in an appropriate and consistent manner.

Root Cause Analysis

What have we done?

Root cause analysis processes are in place to help identify any underlying causes relating to a particular pollution incident in order to ensure symptoms and causes are addressed, this aligns to our systems thinking model. This approach facilitates the identification of risk associated with similar assets, specific manufacturer model equipment and operational philosophies, thus enabling proactive interventions.

Post incident reviews are carried out with all operational personnel involved in the incident. This process captures key lessons learnt from each incident, these can be shared with the wider business in order to prevent a similar issue occurring again.

What will we do?

At present, post incident reviews from across the business are not captured centrally. To enhance our ability to share data and lessons learnt we will develop a central system to

capture all of this information. **Action 004** in section 13 will ensure that a new system is created to capture lessons learnt and that these are shared across the wider business via regular compliance bulletins.

While this root cause analysis process is well embedded within our wastewater business functions, we want to ensure that pollution incident reviews are undertaken consistently for all applicable wastewater infrastructure incidents and water incidents. **Action 005** in section 13 will ensure that post incident reviews are embedded within our standard operating procedures on water and wastewater and are briefed out to our staff where applicable.

Incident forecasting and hotspotting

What have we done?

The ability to forecast incidents before they occur is vital to achieving the stretching targets in AMP7, however successful identification can be challenging across a vast system that is largely underground. Despite the complexities, we have successfully implemented hotspotting techniques across our wastewater network.

Our hotspotting methodology uses modelled data alongside historic performance data to identifying those areas of the sewer network or sites where enhanced monitoring or increased monitoring are needed. Implementation of hotspotting has enabled us to reduce the number of pollution incidents on our sewer network and wastewater process areas.

What will we do?

Following our successes in this area, we are looking into new ways of enhancing our hotspotting technique. We are developing our understanding of the relative risks of our assets which is helping us to develop more of a long-term understanding of developing threats, from changing asset health to climate change to behavioural change. Identification of the appropriate interventions for the different asset types along with an assessment of technical feasibility and cost benefit is key to our approach.

The drainage and wastewater management plan (DWMP) is an industry-wide commitment to develop a long-term plan for all aspects of our wastewater business (network and treatment). Through our DWMP we will identify clusters (hotspots) on our network that can be priorities based on forecast risk due to future pressures on our network such as climate change. Similarly we will identify wastewater treatment assets that are most affected by future population growth and asset deterioration to provide a list of priority areas that will form part of our plan. Initial finding, based on modelled outputs, will be published in June 2022. This will be refined and prioritised as part of the final DWMP which will be published in March 2023, see **actions 017** and **018**.

Assurance of our data

Internal assurance

Internal audits and inspections are performed across the business, focused on technical performance, compliance with the various standards, environmental permits, quality controls, health and safety requirements and site standards. Every year we complete around 50 audits of our water treatment works and around 120 audits of our wastewater sites. In addition to this we carry out more detailed 'themed' audits on topic areas of our Quality, Environmental and Health and Safety management systems.

The programme for these more detailed themed audits is agreed annually with the Executive directors. Audit findings are supported with corrective actions which are evidenced and tracked through to completion. There are standing agenda slots on both the water and wastewater monthly performance meetings to review audit findings and discuss any themes. We report to the Executive directors on a monthly basis and at Group, Audit and Risk Board on a bi-annual basis. A team of 15 auditors delivers the annual programme.

External assurance

Our management systems for Quality (ISO9001), Environmental (ISO14001) and the Health & Safety (OHSAS18001) standards are subjected to external surveillance audits twice a year. This year our certification was maintained for all our standards with very few Minor Non-conformances identified on the surveillance audits. Over the next 12 months we plan to the move to the new ISO 45001 standard (replaces OHSAS18001).

6.2. Culture and capability

United Utilities has instilled a zero pollution tolerance culture across the organisation. A focused approach to managing pollution has driven success to date and this is a strength we will share and build on to deliver the ambition of this plan. Water and wastewater teams across the organisation treat pollution incidents as one of the worst possible service failures and consequently treat pollution with the upmost importance. Robust scrutiny of repeat pollution incidents in terms of assets or receiving watercourses ensure that local managers and there teams are totally accountable for the performance of assets under their operational control.

Culture and training

What have we done?

In AMP6 we embarked on a major training programme and compliance best practice initiative. We jointly delivered a series of pollution-focused training days to our front line operational employees with the Environment Agency. This included the focus on our joint

pollution protocol that both United Utilities and the Agency signed up to, and is unique to the North West.

This pollution and protocol training has been delivered regularly to key operational roles, to keep the focus and importance of pollution prevention and mitigation at the forefront of their minds.

More recently, we have produced an Environmental Compliance handbook, which provides guidance and material to ensure all operational personnel are clear on their responsibilities. This handbook details each roles environmental responsibilities in both complying with sites environmental permits and response to potential pollution incidents. This handbook was supported and rolled out at dedicated roadshows focused solely on all aspects of environmental commitments, processes and performance.

What will we do?

The environmental compliance handbook was initially developed for wastewater treatment employees. In AMP7 we will design an environmental compliance handbook for other business areas and complete the rollout of the handbook and key principles to ensure that all wastewater network and water employees' response to pollution incidents in a controlled and consistent manner, **action 020** of the pollution reduction plan.

We have recently introduced a new central role dedicated to pollution improvement in order to drive the step change required to achieve the new targets set on pollution. This role will be fundamental to further embedding a detailed view of root causes of pollution incidents across the business, in order to understand any themes and ensure appropriate actions have been implemented business wide to prevent a repeat occurrence.

Operational model

What have we done?

Figure 7: United Utilities City Flex unit

As part of our network operating model we manage a fleet of over 70 City Flex combined jetting and suction units (figure 7). These units are equipped to an industry leading specification with a range of high pressure water jetting, root cutting, desilting and CCTV camera equipment.

With over 70 vehicles within our fleet we are able to quickly respond to incidents and the majority of incidents, c70%, can be substantively resolved in one visit. In addition to the above, we also operate an emergency standby service that can attend incidents outside of the core hours, ensuring support during times extreme events such as very poor weather.

What will we do?

In AMP7 we will review the way that we manage our operations to enhance our ability to reduce the number of pollution incidents, see **action 019**.

Maintenance Excellence

As part of our systems thinking approach, understanding the health and the performance of our assets is essential to managing our water and wastewater systems in a best way. Successful management of our water and wastewater assets is crucial to ensuring that we protect the environment and enhance the level of service that we deliver to our customers.

What have we done?

In the past the maintenance of our assets has been manged by local operators and delivered in silo. Often maintenance activities are completed as a result of asset failure rather than through a proactive approach.

Whilst we have made great improvements with Maintenance over the last AMP, we still recognise the need for continuous improvement on our journey to fully establishing an asset reliability culture within United Utilities. Our aim is to progress from a reactive way of working to a way of proactive way of working that delivers Maintenance Excellence across all areas of the business.

To understand our progression on this journey we have benchmarked ourselves against other global organisations using a Maintenance Excellence framework in collaboration with the US arm of Jacobs Engineering. This framework is widely accepted as an industry best practice framework to deliver asset reliability and reduce costs. The results and findings of the benchmark provide the basis of our Maintenance Excellence Improvement Plan across AMP7.

What will we do?

In AMP7 we will create task teams to develop and deliver our Maintenance Excellence Improvement Plan. These teams will consist of representatives from across the organisation and sponsored by our Senior Leaders.

The Maintenance Excellence teams will focus on reviewing current maintenance strategies to ensure that the approach documented is still the best way of managing our diverse assed base. They will undertake a review of current operating processes

including: asset inventory, scheduling/deploying operators and engineers, current maintenance programmes. See **actions 021 to 025** for when these activities will be implemented.

Inventory management

Improving our stock holding and management processes to minimise asset downtime

Maintenance work bank review

Improving the preventative and predictive maintenance tasks using an RCM approach to improve mean time between failure

The way we plan and schedule work

Improving our approach to maintenance planning so that the efficiency of our engineers continues to improve

Maintenance strategies

A review of our approach to ensure that we deploy the most appropriate maintenance strategies across our diverse asset base

Predictive maintenance deployment

Increasing our use of predictive maintenance, particularly focusing on digital CBM and asset health

These reviews will be piloted in the East of a region, starting March 2020 and will be deployed further following reviews and lessons learnt analysis from the trial area. Through implementing the Maintenance Excellence programme we anticipate to see the following benefits:

- A reduction in the number of emergency interventions
- A shift from reactive to proactive working
- A reduction in the time an asset is out of service
- Enhanced digital capability for condition based monitoring on critical assets
- A deduction in maintenance costs
- Improved accuracy of what assets are held in our inventory

6.3. Source control

We have made significant improvements to our operational practices, incident management and review processes in order to improve our level of performance and the service we deliver to our customers. To reduce the number of pollution incidents each year we will continue to develop our systems thinking approach in parallel to implementing other proven programmes of work for reducing the number of pollution incidents.

Customer awareness campaigns

What have we done?

Blockages are the most common cause of pollution incidents making up around 39% of all pollution incidents. Blockages are predominantly caused by sewer misuse whereby customers flush and pour contents that should not be disposed of via the sewer. Items include wet wipes, tampons, hair, fats, oils and greases. The cause of these blockages are of often outside of our control, as such it is important that we are able to engage with our customers as to what not to flush.

One way that we have started to engage with customers is when we are attending a pollution incidents, we will share awareness literature (figure 8) that covers the causes of blockages and the part our customers play in protecting the environment from pollution incidents. It is necessary to influence our customers' behaviour if we are to achieve our desire of zero pollution incidents.

Figure 8: Examples of customer campaign material

What will we do?

In AMP7 we will have a dedicated programme of customer engagement and awareness activities, with the aim of achieving a 10% increase in awareness of sewer misuse, e.g. understanding what not to flush and/or pour. This aim aligns with our customer engagement performance commitment that forms part of our business plan.

Utilising customer segmentation principles we will now carry out a trial to develop approaches that allow us to effectively target our messages and communication methods to our customers. This information will enable us to further develop our awareness campaign to make sure we are communicating with our customers in the most appropriate way depending on their preferred methods of communication and shared values. Targeting our messages in a more meaningful way for our customers will enhance engagement and as a result reduce the number of blockages and pollution incidents, see **action 013**. We will take the learning from this trial and integrate it into our engagement activities. Each year we will report our performance against our AMP7 customer engagement measure as part of our annual performance report.

Sustainable Drainage Systems (SuDS) and surface water removal

What have we done?

The challenge of ever increasing rainfall events is an issue we face today, which is why Sustainable Drainage Systems (SuDS) and surface water removal is at the forefront of our plans and will be central to what we do in AMP7 and beyond.

Separating out surface water or slowing the flow can deliver sustained benefits of capacity in the sewers and system resilience. We aim to deliver separation and slow the flow interventions, as well as influencing sustainable surface water discharges from all new development sites. Some of our ongoing activities are outlined below:

- **Lobbying the planning framework**
  We have proactively led a detailed submission made on behalf of Water UK to the Ministry of Housing, Communities and Local Government (MHCLG) on their publication 'Review of the Application and Effectiveness of Planning Policy for Sustainable Drainage Systems'. Although not a consultation document our response highlighted specific concerns with national planning policy with respect to the effective delivery of sustainable surface water management.

- **Influencing planning**
  Our engagement in the planning system is aligned to statutory obligations, which includes a right to connect foul and surface water to the public sewer. Whilst we support new connections, we are proactively working with the planning authorities to promote sustainable surface water decisions. We are not a statutory consultee for planning applications, however we proactively monitor the registers of applications and provides comments on many.

- **Pre-development support**
  Our Developer Services team offers a free pre-development enquiry service to discuss proposals and to encourage early dialogue to influence sustainable surface water management.

What will we do?

We see SuDS and surface water management as a key to reducing pollution and reducing spill frequencies at overflows. We have initiated a number of activities aimed at reducing the surface water volumes discharged to sewer and therefore reducing the volume of surface water sent to wastewater treatment.

We aim to develop these initiative as we progress into AMP7 and beyond. Examples of what we are doing can be found below:

- **Separation**
  We have appointed a SuDS lead, who is looking for separation and slow the flow opportunities. We are currently progressing a partnership working solution and exploring two separation opportunities, see **action 026** in section 13.

- **SuDS adoption**
  On 1 April 2020, the sewerage Sector's Design and Construction will be implemented. This provides Water Companies with the ability to adopt SuDS components that come within the meaning of a sewer. We have played a big part into this work led by Water UK since 2016. During this time we have vested our first SuDS component as a public sewer, and are progressing the adoption of SuDS at a further ten trial development sites, with further opportunities being explored. The learning from United Utilities' trial adoption sites has helped the water industry to identify our training needs and has directly informed the development of the water industry training requirements. We have been central in leading the development of this training package on behalf of Water UK with partners CIWEM-CIRIA, see **action 025**.

- **SuDS maintenance**
  Ancillaries (e.g. channel, headwalls, catch pits, infiltration media) will be maintained by United Utilities, however the general landscaping and aesthetics will remain the responsibility of the landowner, managed through a legal agreement. We now have SuDS built into our Asset Data Hierarchy and we are working on a level monitoring proposal for infiltration solutions. This monitoring will capture data to inform long term performance of these assets.

- **Data**
  We are supporting an industry project on SuDS symbology and attribution to ensure we have reliable and accurate data to inform planning and maintenance schedules. We are committed to sharing industry best practice in this areas, see **action 027** in section 13.

Food service establishments and Fats, Oils and Grease

What have we done?

Fats, Oils and Grease (FOG) enter sewers via three sources: domestic; commercial food service establishments; and industrial discharges. FOG can quickly accumulate and cause a number of issues, including pollution incidents.

Water industry research shows that FOG causes a significant proportion of blockages and the binding effect of FOG means that other materials, such as wipes, will combine together to form blockages. This project will implement and benefit from internal and external industry research on prevention and removal techniques with primary focus being on identification, monitoring and education for FSE owners and operators. Our tough targets for pollution mean that we need to be more proactive in terms of our activity to prevent blockages forming.

We have developed literature and processes that will allow us to interact with food service establishments and influence them to adopt practices that prevent the discharge of FOG to our networks.

We have commenced a trial that can carry out FOG management audits at food service establishments and provide expert advice to occupiers on how they can prevent the discharge of FOG to the sewer network.

The reduction of FOG being disposed of to our network will reduce the number blockages that can lead to pollution incidents.

What will we do?

The largest single cause of pollution incidents is blockage. As FOG blockages are caused by our customers, in AMP7 we will undertake customer campaigns to influence customers to prevent wherever possible the disposal of FOG to the sewer network. This is covered in our action plan under **action 013**, section 13.

7. Case study: Systems thinking in water network management

United Utilities has over 42,000 kilometres of clean water distribution network pipes. We supply urban and rural areas with a diverse water infrastructure network of sizes and ages. We have one of the lowest average age networks in the industry, but we still face significant challenges when it comes to keeping the taps running for our customers and preventing environmental pollution from mains bursts.

Reducing mains bursts and their impact on both customers and the environment is a key part of our long-term strategy.

Figure 9: Burst on a 10" polyvinyl chloride main in Chorley, 2018

Our dual approach to minimising the impact caused by mains burst is based on developing our immediate operational response as well as planning for longer-term resilience of the water network.

7.1. Planning for the future

Alongside the immediate response and repair, we are increasing the resilience of the water network by focusing on developing a thorough understanding of the risks to our water supply system and our approach to managing them. We minimise the risk of a network event such as a burst through optimising the operation of the network from source to tap, operating a 'calm' network to minimise immediate disruption or long-term stresses to pipes that can be caused by sudden flow or pressure changes. Long-term planning will ensure that we manage and invest in the network to prevent mains bursts from occurring.

Our approach is built around understanding risk and increasing the flexibility of our systems, allowing us to respond to the diverse range of hazards to which our systems are exposed. The criticality of mains is assessed and prioritised leading to actions to mitigate the risks. This includes increasing the understanding of how the network operates and the risks facing the system through the development of contingency plans, installation of addition valves and cross-connections to increase flexibility and resilience in network operation. In addition, we are planning a phased replacement of high consequence network assets, focused on those with the highest failure rates.

The reliability of supply can also be affected by factors outside our control as our large asset base is exposed to hazards such as extreme weather, security risks and third party damage. However, we can build resilience into our assets, so they resist hazards, and into our systems, so they absorb the effects of losing assets. Redundancy in systems also reduces the risk of failure against our own assets, whether they are pipes, valves, pumps or treatment works. We monitor these risks carefully to plan investment and recognise that we need to adapt our plans in response to change customer expectations.

7.2. Focus on response

Our improving performance in recent years has been based on the development of our Integrated Control Centre (ICC). The ICC is conceived as the central hub of our operations, maintaining constant situational awareness of the services we are offering customers and the environment and the risks which could impinge on these services. This has been underpinned by an increasing range of options to mitigate the impact of events such as alternative supply tankers, intelligent valves and operational staff with information at their fingertips. The ICC support has developed alongside a change in culture and focus on saving every second, reinforced through the 'Focus on the 3 R's – response, restoration and repair'.

7.3. Response

Increasing use of data and technology in the control centre using software to monitor flows and pressures alerts us to likely issues developing in the water network. This allows us to get a head start on our response before customers or the environment are impacted. This provides an opportunity to understand the pathways in which water can impact the water environment and intervene at the earliest opportunity. Deployment of simple devices to prevent water from burst and leaks from entering the water environment is key.

Implementing 24 hour support at all levels within the ICC and in the field means we have the people, knowledge and systems to ensure that we can respond quickly at any time.

7.4. Repair

We have worked with our construction partners and suppliers to actively promote non-disruptive techniques and repair methods and focused on innovative ways of working to ensure that we have a co-ordinated response to the event and can complete the repair with minimum disruption to the customer and the environment. This includes purchasing and storing of critical spares to ensure that repairs are not delayed by waiting for additional parts.

Figure 10: Water tankers

The changing climate with more extreme events such as the 'Beast from the East' and recent periods of prolonged dry weather is placing unprecedented demands on our system. This reinforces the focus on building resilience for our long-term strategy.

8. Case study: Systems thinking in wastewater network management

An effective drainage system mitigates the risks that can lead to flooding, pollution and other impacts on the service customers experience, such as restricted toilet use. We are continually innovating to reduce the number of incidents caused by our network. This case study describes our innovative approach, which has been initially piloted in Preston, and which we have called Wastewater Network Management (WwNM).

The objectives of the WwNM project are to improve our knowledge, management and performance of the wastewater network to improve the service to customers at the lowest possible cost. We have applied our AMP7 operating model concept on the systems thinking approach, as set out in Figure 11 below:

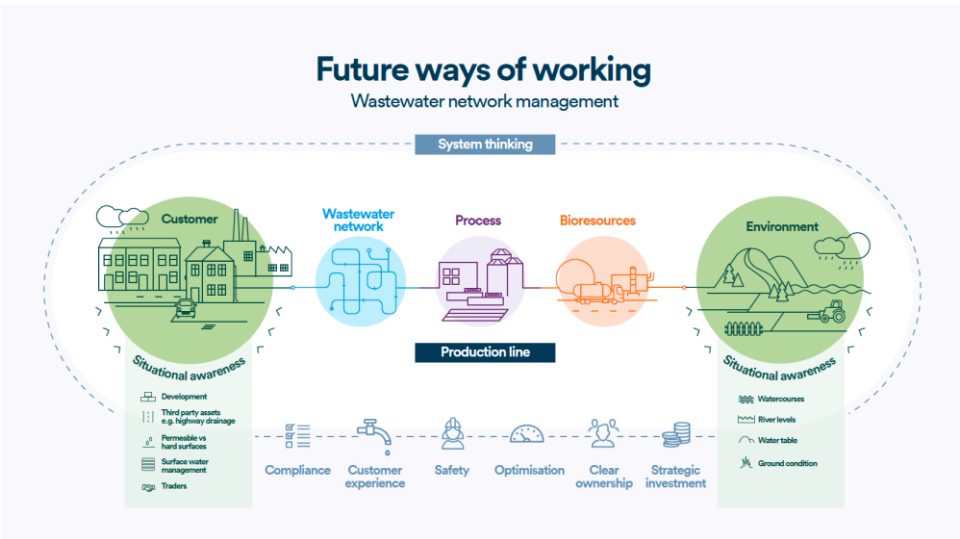


Figure 11: Future ways of working concept for WwNM

The programme is underpinned by a clear vision for the wastewater network; to continue the evolution towards a proactive, predictive and risk-based service. This change in performance will be founded on good quality, timely and accessible data as well as system-led thinking.

Through extensive customer research and analysis of customer call data we have observed that effective wastewater removal is a priority for customers. Managing flooding ranks highest of all the wastewater services, closely followed by accidental spills leading to pollution of watercourses. These customer priorities, along with striving for service at lowest cost, drive this initiative.

The need to continually improve our drainage service is an additional priority for us due to the fact that the North West is one of the wettest areas of the country. This makes the challenge of managing the wastewater network and the associated customer service more demanding than other regions and makes the need for innovation even greater.

8.1. Innovation for customer benefit

The WwNM programme is a series of innovative projects that are interdependent and that will improve the performance of the drainage system. The five main areas are:

1. Dynamic Network Monitoring

Software that will enable monitoring and visualisation of high risk assets and production line performance within a drainage area. This visualisation supports our direction for further centralisation and efficiency that this brings with it.

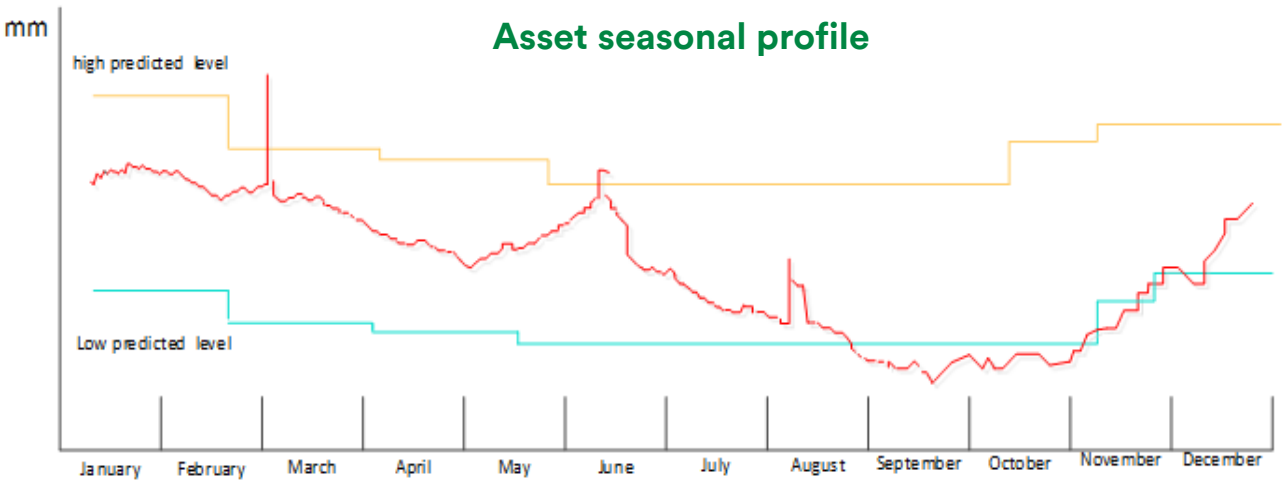


Figure 12: The system identifies the performance trends or network signature based on a number of parameters. This can then be used to identify issues as these measurements start to change, which can be acted on proactively.

The software monitors changes in the network which can indicate whether an incident is likely to occur. The system alerts the user to allow a proactive intervention which can result in the prevention of an incident, or provide warning.

This solution will use a combination of existing systems to identify network performance trends and operational parameters for incidents, known as the network signature (see figure 12 above). This signature will be able to determine changes to operational flow based on time of year, hour, weather condition, and as time goes on, potentially other factors.

The business rules described above will use the network signature to notify when a change in operational parameters indicates a particular type of issue is occurring or about to occur. Jobs will then be scheduled proactively to address the issues before they cause impact, such as a flooding incident.

2. Visualisation

Software solution which visualises key information and provides insight allowing analytics and diagnosis of data by our operational teams.

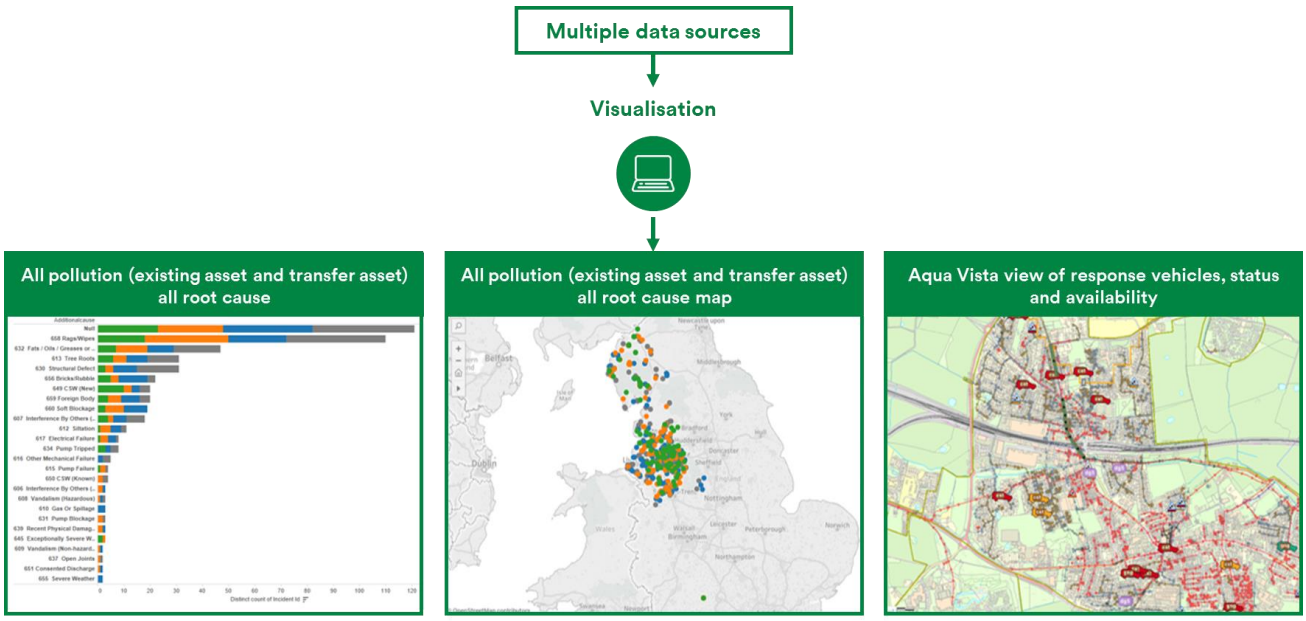


Figure 13: Example outputs of WwNM data visualisation

The Visualisation project delivers information from multiple source systems in a single place. This will allow the overlay of different types of contextual data to inform long-term investment and intervention decisions, monitoring plans and post-implementation review of the innovation projects, as shown in figure 13 above.

Data will be displayed – either as a traditional report, an immediate graphical depiction or as part of a geo-spatial view overlaid on a map of the network.

The project will utilise Exasol as the system tool that combines data together. Reports will be generated via Tableau and displayed in a map view using the AquaVista tool, an offshoot of GIS that allows data from multiple sources to be displayed within a geo-spatial context.

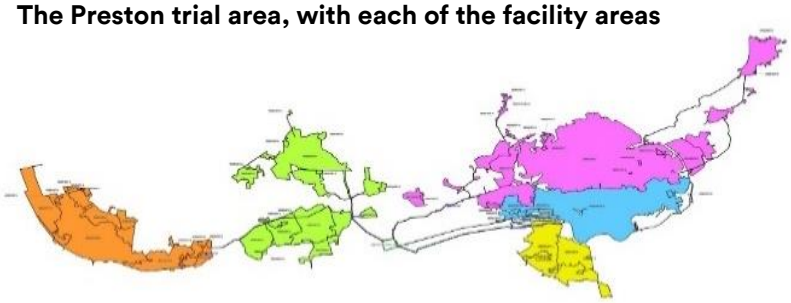
3. Unit Cost to Drain

Enable decisions based on fixed and marginal costs of all aspects of the wastewater network to understand those aspects that have most influence in improving the efficiency of the whole system.

4. Proof of concept pilot

Create and implement a methodology to help understand and implement an area performance improvement plan for the area serving the population of the city of Preston.

The Preston trial area, with each of the facility areas



Each colour represents a Tier 1 facility area which delivers sewage into the inlet at Preston wastewater treatment works. Prior to this pilot, areas could have been represented by four District Council boundaries (Preston, Fylde, South Ribble and Ribble Valley); one Drainage area (Clifton Marsh/Preston) and 36 Sub Drainage Areas, all of which do not fully represent the connected sewer network.

Figure 14: Preston facility areas – WwNM trial area

5. Regional rollout

Apply the outcomes and learning from the pilot in Preston to areas of interest or priority, e.g. those with greatest performance challenges.

The most effective innovations will progress and will form part of the regional roll-out. From this roll-out of innovation, customers will benefit through a reduced likelihood of collapse and blockages on the sewer network, which can result in restricted toilet flow and potentially lead to flooding and/or pollution. There are also efficiencies to be made and a more resilient service from the project that will benefit customers in the region today and into the future.

8.2. Piloting WwNM in Preston

The concept of WwNM has been trialled in Preston and is now being rolled out regionally in five areas to be controlled via hubs. A portfolio of technologies and techniques have been trialled and this is a continual process. Some of these trials are complete and the benefits are being considered for regional roll-out; other approaches are still being appraised.

The wastewater network system is wider than just our asset base; it has critical connections and interactions with other external systems such as local authority drainage systems and watercourses. It is also impacted by external factors such as development and the weather.

One small change in the cycle can alter the dynamic and performance of our system drastically. It is through WwNM and the systems thinking approach that these relationships can be understood and in turn deliver a more streamlined and efficient service for our customers.

The new methodology developed has a focus on proactively managing our network. This will benefit customers and the environment by reducing the consequential impact failures our network can cause. The methodology was deployed as part of the proof of concept pilot in the Preston drainage area and consists of ten activities (figure 15).

1. Facility area creation	2. Schematic creation	3. Asset inventory review, validation and amendments	4. Sewer and point asset risk assessment	5. 'As is' drainage area maintenance plan and 'to be' maintenance plan
6. 'As is' monitoring plan information for facility areas and 'to be' monitoring plan	7. Discuss and review area issues utilising historic performance data	8. Develop asset and WwTW drainage area implementation plan	9. Define investigatory / survey requirements	10. Determine benefit associated with implementation plan

Figure 15: The ten initiatives in the Systems Thinking Wastewater Network Management pilot

8.3. Continuous improvement

The business processes developed as part of WwNM will be embedded across the business; for example, WwNM has primarily focused on the network system, but we are taking a system thinking approach to ensure that the most mutually beneficial solutions are considered across the wastewater system.

WwNM will provide the building blocks for our AMP7 strategy and will underpin Wastewater Drainage Management Plans that will be a significant development from 2018 through into AMP7. Teams within our Integrated Control Centre have been engaged to understand the step change in our processes which need to be applied in order to meet the data requirements of the project and improve our data capture.

8.4. Innovation delivering more for less

In AMP7 we are rolling out the concept of WwNM across the region as a fundamental part of the wastewater network strategy that will support our progress towards upper quartile and achieve our performance commitments. Our commitment in AMP7 is to reduce blockages by 11% over the five years and we expect to invest further in WwNM and associated activities, delivering efficiencies and improved services in AMP7.

8.5. Benefits for the future

There are several strands which make up the WwNM project. The proof of concept phase which includes Dynamic Network Monitoring and visualisation have now been completed and have been embedded as business as usual processes. Following a review of the lessons from the pilot in Preston, the concept is now being implemented across the region. This improvement in capability underpins our approach to delivering the step change required in AMP7 for many of the wastewater network performance commitments.

9. Best practice sharing

Over recent years, as a result of our industry-leading pollution performance, we have received requests from other water companies for benchmarking meetings. These sessions are centred on facilitating learning from our methods and sharing good working practices. In some cases those companies have then gone on to make step change improvements in their performance levels that have resulted in United Utilities teams visiting them to download their best practice areas that have driven such improvements.

Additionally, we have presented our methods and pollution reduction initiatives at national water company/Environment Agency joint incident workshops and at a national zero pollution seminar in the past year.

We commit to continue sharing best practice across the industry in the UK and have also engaged with organisations in Europe and beyond to seek out innovative practices and techniques that will assist in further improving our environmental performance.

10. Risk management

We have an industry-leading approach to managing risk, including bespoke tools and processes to improve the consistent capture and quantification of risks from across the business. Identifying risk in this way allows for comparison between different business areas and asset types to allow for risks to be appropriately managed and for prioritisation of appropriate interventions. This tool has been rolled out across our wastewater treatment assets and will be more widely rolled out to ensure all risks are captured in one place.

Prioritisation of projects is aligned to our risk and asset planning framework whereby risks are raised and managed at a local level and escalated where appropriate. A variety of solutions are considered through various generic options which ensures that the most appropriate solution can be selected and the whole cost of the project delivery is considered.

Over the next five years, from 2020–25, we are evolving our Programme Management capability in line with Managing Successful Programmes (MSP) best practice. This will enable us to maintain a view of anticipated programme benefits against strategic targets throughout programme prioritisation and delivery. We'll manage this process using internal governance groups to review and monitor the glide path towards the achievement of strategic goals, including performance commitments, ensuring a balance is maintained across price controls and strategic, long-term goals.

Figure 16: Risk and asset planning framework

11. Planning for the future

We are currently progressing well in delivering our first Drainage and Wastewater Management Plan (DWMP). Our aim is to produce an industry-leading DWMP which provides us with a robust understanding of risk and key steps to address this.

Our approach is a data-driven methodology underpinned by internal expertise to enable us to produce a robust long-term plan for the period beyond 2025. We are engaging across the business and with stakeholders to ensure that the plan represents the best long-term interests of the North West and showcases innovation alongside the desire for a better future.

Our data gathering and analysis is well underway and we are assessing a broad range of risks and opportunities. A key aspect of the plan will be driving towards the long-term ambition of eliminating unpermitted pollution incidents. Data around population growth, climate change, spill performance, system capacity and resilience will inform our understanding of future pollution risk.

The risks identified will be appraised and options developed to mitigate them. These options will allow us to target investment in the form of capital investment, partnership solutions and operational interventions and will inform our AMP8 business plan.

Current risks will be fed back to operational teams and any operational interventions will be identified collaboratively to ensure alignment with Integrated Drainage Area Strategy (IDAS) operational interventions. Interaction between IDAS and the DWMP is shown in figure 17 below.

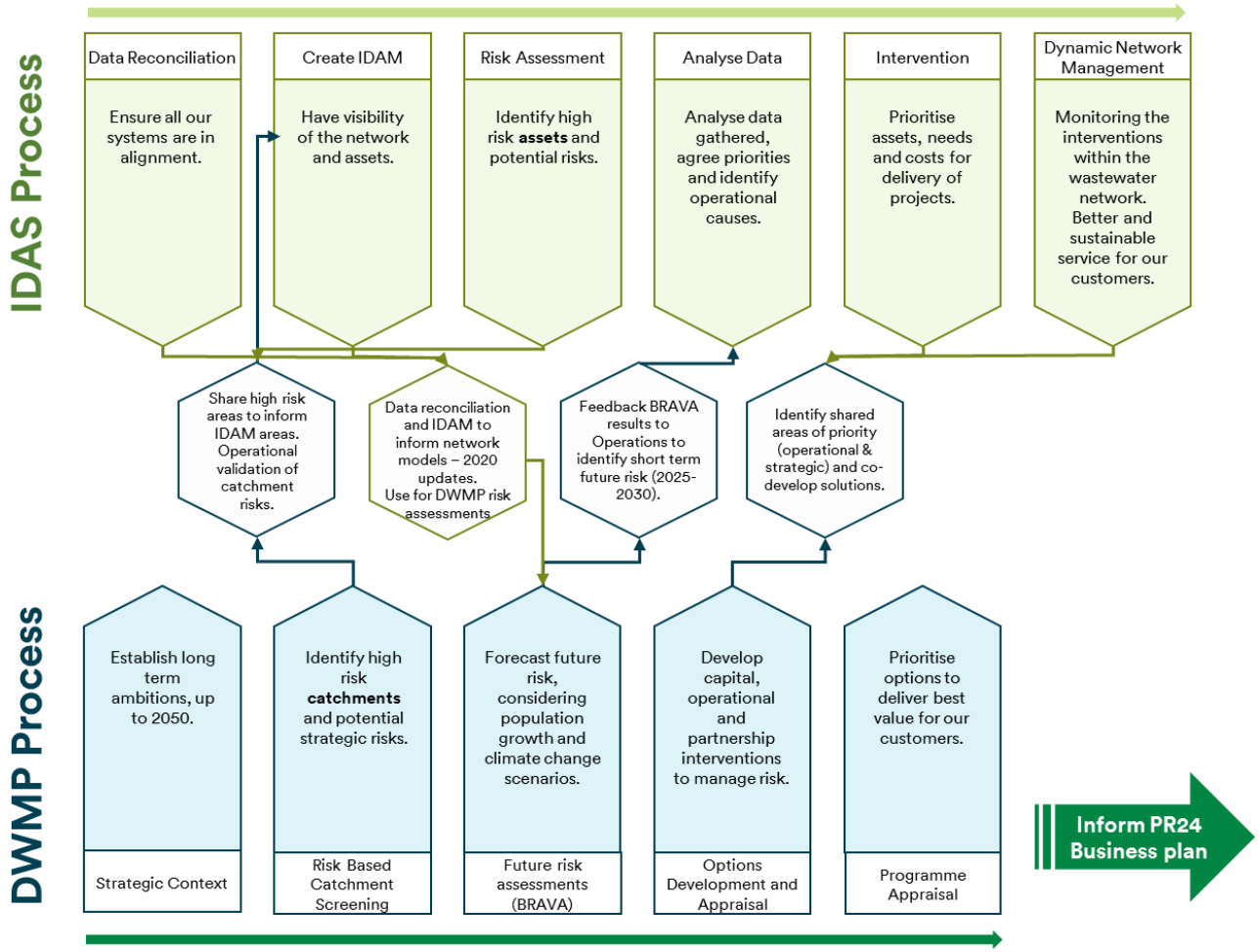


Figure 17: Interactions between the integrated drainage area strategy and the drainage and wastewater management plan

The integrated drainage area strategy and the drainage and wastewater management plan will inform our PR24 submission.

Through the DWMP we are setting up 14 strategic planning groups, involving the Environment Agency, Lead Local Flood Authorities and Catchment Based Approach partnerships to identify opportunities for co-delivery of partnership solutions across other strategic plans, e.g. River Basin Management Plans and Flood Risk Management Plans. Partnership working will be prioritised in options development. Figure 18 below shows the key milestone in the production of our DWMP along with the various inputs into each stage. To the right we have how pollution risks are progressed through the DWMP.

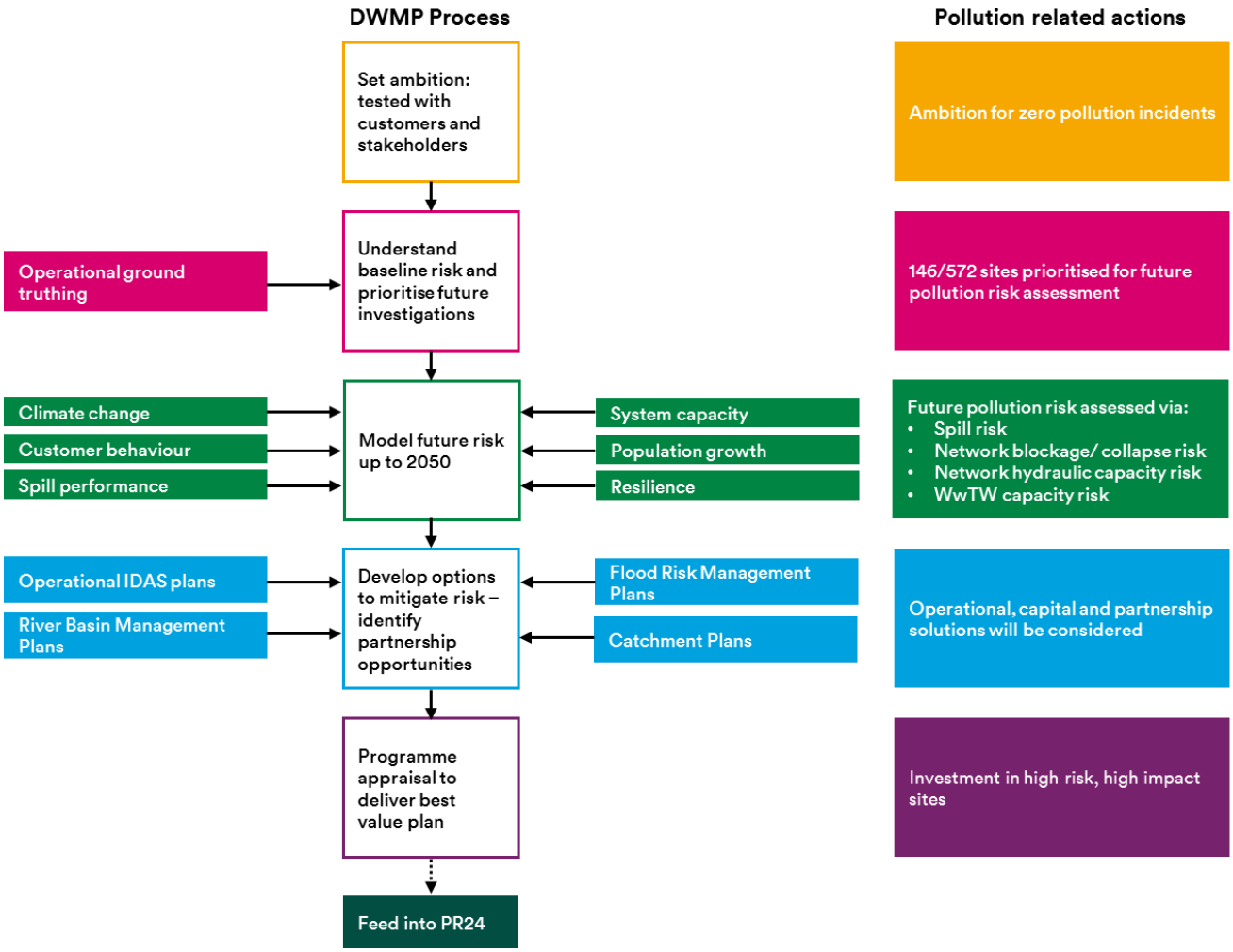


Figure 18: DWMP process flow diagram

Future pollution risk will be identified though the DWMP, these risks will scored and priorities in line with all other measures incorporated into the plan. This approach ensures that we are taking a holistic approach to managing risk in the future and looking at wastewater as one system opposed to individual risks.

Timescales for the DWMP are for a draft for consultation to be published mid-2022 and a final to be published spring 2023.

12. Governance and review process

To ensure this plan is maintained, transparent to customers and stakeholders as well as delivery focused, we are committing to a level of internal governance and Environment Agency review and sign-off as outlined below:

Level	Frequency	Detail
Environment Agency/ United Utilities review of progress	Quarterly	Quarterly updates through United Utilities / Environment Agency Performance Management Group with escalation routes available to Strategic Liaison Group if necessary
United Utilities Board	Annually	Sign off initial plan by April 2020 with proposal to delegate monitoring to Executive. An update on Pollution Incident Reduction Plan progress would then go to the board annually so they have visibility of performance and progress.
United Utilities Executive	Quarterly	Quarterly review of pollution performance and progress of PIRP actions
United Utilities Operational Directorates	Monthly	Monthly review of pollution performance and progress of PIRP actions

13. Pollution Incident Reduction Plan: actions

In line with the details contained within this plan, below are the specific actions identified by United Utilities as part of our plan to reduce the number of pollution incidents and our impact on the natural environment.

Reference	Business area	Theme	Action	Measure/ evidence	Timescale
001	Water, Ww Network, Ww treatment	Culture	Ensure that annual mandatory compliance training is completed by relevant operational employees	Training register	October 2020
002	Water, Ww Network, Wastewater treatment	Culture	Ensure mandatory Section 166 e-learning is completed annually for relevant operational employees	Training register	October 2020
003	Water, Ww Network, Wastewater treatment	Culture	Ensure all new starters complete all suite of environmental pollution and permit training	Training register	October 2020
004	Water, Ww Network, Wastewater treatment	Lessons learnt	Centralise the lessons learnt from pollution incident reviews and ensure they are shared across relevant teams	Compliance bulletins	Complete for Ww treatment, July 2020 for Ww Network, July 2020 for Water
005	Water, Ww Network, Wastewater treatment	Lessons learnt	Ensure that pollution incident reviews are undertaken for applicable wastewater infrastructure incidents and water incidents	Standard operating procedure briefing register	Complete for Ww Treatment, July 2020 for Ww Network, July 2020 for Water
006	Water, Ww Network, Wastewater treatment	Lessons learnt	Centralise the lessons learnt from spill investigations and ensure they are shared across relevant teams	Spill performance dashboard for performance management meetings	Quarterly

Reference	Business area	Theme	Action	Measure/ evidence	Timescale
007	Water, Ww Network, Ww treatment	Effectiveness of interventions	Effectiveness of pollution reduction plan reviewed through business planning meetings	Compliance Board – Wastewater treatment Business Performance Review – Wastewater Network Quality Performance Meeting – Water Network	Monthly
008	Water, Ww Network, Ww treatment	Performance reporting	Ensure consistent and effective reporting is provided to all relevant parts of the business including the Executive	Monthly Exec Board report produced with detail of environmental performance Monthly Director performance meetings which include a slot for environmental compliance and performance Quarterly Business Review meetings with the CEO to do a deep dive review of environmental performance measures	Monthly and quarterly (BAU)
009	Water, Ww Network, Ww treatment	Performance Reporting	Ensure that relevant actions from post incident reviews are reported and escalated though corporate systems in order to develop plans associated with risks	Make sure business processes are in place to enable reporting.	Quarterly

Reference	Business area	Theme	Action	Measure/ evidence	Timescale
010	Water, Ww Network, Ww treatment	Incident response	Review guidance for ICC to ensure that water pollution events, when necessary, are considered for environmental implications	Amend current ICC Response Manager water event process to add a step in to ensure this is considered and acted upon where appropriate	June 2020
011	Water, Ww Network, Ww treatment	Resources	Work with the Environment Agency to minimise the number of non UU pollution incidents attended to so that correct authority can attend leading to quicker resolution and improved environmental outcomes	Discuss examples and solutions with Environment Agency at quarterly performance meetings	Quarterly
012	Ww Network, Ww treatment	Managing third party risks	Work with electricity suppliers to understand our wider resilience and minimise the risk of power loss	Scheduled and documented meetings with DNOs regarding supply quality issues Review of outages (unplanned and planned) and the causation / duration of them Report on a review of our critical sites and assess supply resilience	December 2020
013	Ww Network, Ww treatment	Working with customers	Work with our customers to improve awareness of what they should/shouldn't put down the drain to reduce blockage risk	Annual performance reporting for performance commitment	Annual July report

Reference	Business area	Theme	Action	Measure/ evidence	Timescale
014	Ww Network, Ww treatment	Working with customers	Deliver a decrease in Fats, Oils and Grease (FOG) reaching our network through targeted education, monitoring and enforcement of food establishments	Number of visits to food establishments	Bi-annual reporting
015	Ww Network, Ww treatment	System Thinking	Explore the opportunity from increased data availability and monitoring for trend analysis and system modelling. Look for opportunities to utilise advanced analytics	Report of opportunities and roadmap	December 2020
016	Ww Network, Ww treatment	Long-term planning	Deliver initial view of long-term catchment vulnerability to pollution from population growth, climate change and other influences	Baseline Risk and Vulnerability Assessment report complete	December 2020
017	Ww Network, Ww treatment	Long-term planning	Plan of risk, opportunities and potential 25-year plan	Draft DWMP plan issued	June 2022
018	Ww Network, Ww treatment	Long-term planning	Plan of risk, opportunities and potential 25-year plan	Final DWMP plan issued	March 2023
019	Ww Network	Long-term planning	In AMP7 we will review the way that we manage our operation to enhance our ability to reduce the number of pollution incidents	In our annual performance report we discuss how changes in our operation model have led to improvements in our pollution performance	Annually
020	Water, Ww Network, Ww treatment	Culture	Design and delivery of the Environmental Compliance handbook to wastewater network and water in prioritised way	Environmental Compliance handbook and training register	April 2021

Reference	Business area	Theme	Action	Measure/ evidence	Timescale
021	Water, Ww Network, Ww treatment	Maintenance	Maintenance Reliability strategy to be refreshed	Strategy produced and signed off	July 2020
022	Water, Ww Network, Ww treatment	Maintenance	Maintenance and Reliability training to be developed for field staff	Training materials produced and complete	October 2020
023	Water, Ww Network, Ww treatment	Maintenance	End-to-end maintenance processes reviewed and refined	Completed review with associated report complete	Feb 2021
024	Water, Ww Network, Ww treatment	Maintenance	Re-tender of inventory management supplier	New supplier arrangement in place	April 2021
025	Ww Network, Ww treatment	Lessons learnt	Following the trialled adoption of SuDS in AMP6 we will write a completion report/ training pack highlighting our findings and lessons learnt	Development of the training package	One year after adoption of the SuDS trial
026	Ww Network, Ww treatment	Partnership	We will look to implement sustainable drainage solutions in AMP7 and where possible do so in partnership	Evidence pack upon complete of a scheme	Upon completion of a scheme
027	Ww Network, Ww treatment	Culture	We will commit to contributing to industry wide sustainable drainage projects, sharing our knowledge and data	Input and drive discussions at industry forums	Ongoing

14. Monitoring and update of the plan

This Pollution Incident Reduction Plan has been developed to cover actions to mitigate the risk of pollution incidents impacting the water environment based on a thorough understanding of the root causes of such incidents.

The operational directors accountable for delivery of actions have confirmed they are deliverable and the plan has been signed off by our Board.

Progress will be tracked at several levels in the organisation, including at the Executive level through monthly reports on pollution incident performance and progress updates on the planned actions at least quarterly.

Additionally, the plan will be reviewed at least quarterly with the Environment Agency to track progress. Each year the plan will be reviewed in light of performance and emerging risks; this may lead to the update of actions or additional actions.

To provide assurance that we are delivering against the plan we will obtain independent assurance of action delivery annually and this will be reported on in updates to the plan which we will ask the Board to sign off.