

IAP response
YKY.PD.B1-B2

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About this document

We submitted our PR19 business plan to Ofwat in September 2018. Ofwat reviewed the plan and published its initial assessment in January 2019. The assessment included a series of required and advised actions for us to complete by 1 April 2019, as well as several that required completion after 1 April 2019. This document provides our response to advised IAP actions YKY.PD.B1 and YKY.PD.B2, described below, submitted to Ofwat on 24 May 2019.

IAP Action YKY.PD.B1

“Yorkshire Water should produce and provide additional evidence that it has identified:

- the drivers of incidents performance and customer communication and support performance during and after major incidents, pollution incidents and where statutory and licence obligations enforced by the EA/NRW, DWI and Ofwat have not been met;
- lessons learnt from good and poor past and current performance;
- the performance gap between current performance and proposed performance in the 2020-25 business plan; and
- measures planned or already in place to ensure deliverability of the 2020-25 business plan.”

IAP Action YKY.PD.B2

“Yorkshire Water should produce and provide an action plan that sets out:

- how Yorkshire Water will continuously monitor incidents performance and customer communication and support during and after major incidents and deliver targets set by the EA/NRW in the Environmental Performance Assessment (EPA), by DWI and by Ofwat’s regulations , including what evidence it will look for beyond itself and the sector;
- how Yorkshire Water will identify drivers of performance and lessons learnt from both good and poor performance;
- how Yorkshire Water will identify measures to improve performance and integrate these into its business; and
- how Yorkshire Water will ensure that this is a continuous rather than one-off process.”

In support of our response to this action, we provide the following:

- Appendix 1 - Company Incident Management Handbook
- Appendix 2 – YW report on ‘Out in the cold’

Assurance of our IAP response

Good assurance needs to be provided at the right time, be proportionate to the level of risk identified, ask the right questions and assess the quality of evidence supporting the statements made. Our assurance approach is risk based and aligned to the 'three levels of assurance' framework. This is best practice and is set out in Yorkshire Water's published Assurance Plan for 2018/19 and 2019/20.

The assurance process includes audit checks and challenges by information providers, publication managers and senior managers.

Both action responses have been subjected to review and sign-off through our internal level 1 and 2 assurance activities. This has tested completion and compliance of the information submitted in this IAP submission.

YKY.PD.B1

At Yorkshire Water, we take our incidents performance very seriously and are pleased that Ofwat has stated that we performed well and largely met our customers' expectations during the 2018 freeze/thaw event commonly known as the 'Beast for the East'. We recognise we still have room for improvement and continuously review and update our processes to reflect this. We have rigorous processes for managing, monitoring and reviewing our performance during and after incidents. This includes implementing lessons learnt exercises to further enhance our future capabilities and procedures. We describe this process in the Company Incident Management Policy section below and provide highlights from our approach to customer communications and support during incidents.

Our PR19 plan represents a step change in performance for Yorkshire Water. We plan significant service improvements across our PR19 plan and have highlighted our upper quartile programme for this response, as it consists of the areas that matter most to our customers and deliver the greatest performance stretch. We also highlight our current Drinking Water Quality Contacts performance commitment, noting feedback from Ofwat that we could have better demonstrated that we understand performance drivers and have learned lessons. In our response to action YKY.PD.B2, later in this document, we include the planned measures and those we are already undertaking to ensure the deliverability of our upper quartile programme. With our planned performance step changes, we will be reliant on applying successful innovation to deliver our future stretching targets. We have therefore highlighted relevant aspects of our innovation approach and plans to provide further confidence over our ability to deliver our stretching PR19 plan.

Company Incident Management Policy

We have a tried and tested Company Incident Management Policy in place. The policy is owned by our Chief Executive, and it defines our approach to incident management.

Underpinned by the policy, we have documented company incident management plans and procedures that describe our incident management practices, command structures and procedures to be followed in the event of an unplanned interruption to service. We use these to manage, monitor and review our performance during and after incidents, leading to the effective capture and implementation of lessons learnt. Our Incident Management Handbook, provided in Appendix 1, is used to raise awareness of the policy and provide a key reference point.

We initiate our incident management process for every incident. Managed through duty managers within the company control room, the process ensures that all appropriate areas of the business, including our customer service and communications teams, are engaged and coordinated. Once an incident has concluded and services to customers have resumed and remedial actions resolved, we undertake a thorough review to ensure that we identify lessons to be learned. We then work to implement improvements identified into our processes and practices. The aim of the incident management process is to:

- Recognise the escalation of a risk to the point where it is likely to materialise and take appropriate steps to mitigate its impact.
- Effectively manage all operational incidents and facilitate a controlled return to normal operations as soon as possible.
- Ensure compliance with legal and statutory requirements despite difficult circumstances.
- Ensure a process of continual improvement.

Our Company Incident Management Policy sets out the key steps to be undertaken when an incident is triggered and details all roles and responsibilities for those managing the incident. The plan defines the difference between an incident, a serious incident and a crisis. The process of escalating between these categories is summarised in Figure 1. Our definitions and owners for each category are provided in Table 1.

Escalation flow-chart

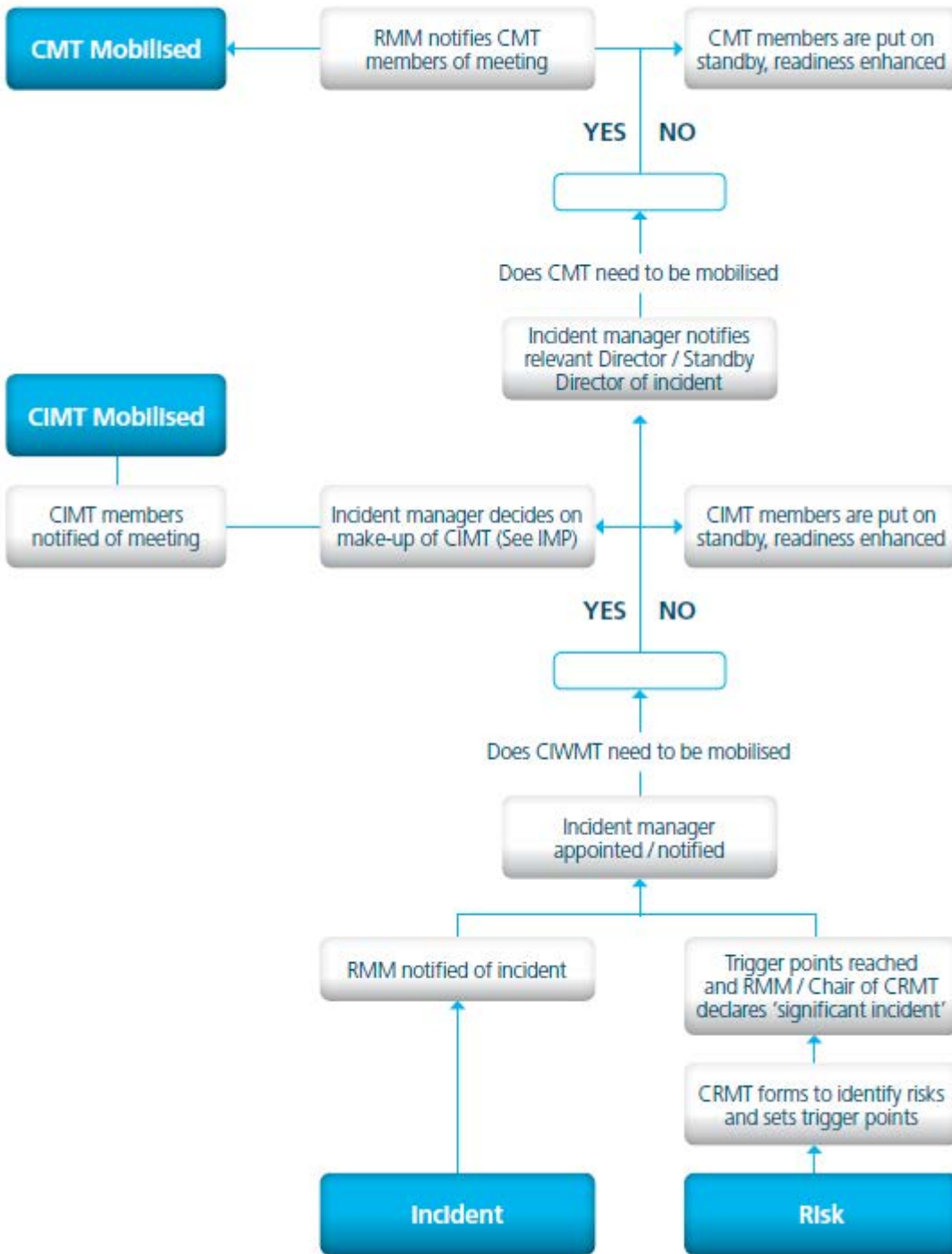


Figure 1: Escalation flow chart from risks to a crisis

Table 1 – Escalation definitions and owners

Category	Description	Owner
Risk	A risk can be defined as a future problem that might be avoided or mitigated, rather than a current problem that must be immediately addressed. The effect of risk is to introduce uncertainty to the achievement of our business objectives.	Company Risk Management Team (CRMT)
Incident	An incident is a routine matter that does not disrupt service levels beyond an acceptable level but may require the re-organisation of priorities at a local level to ensure continued regulatory compliance.	Duty Manager (DM)
Significant Incident	A significant incident disrupts acceptable service levels. It may have significant financial implications or may breach regulatory requirements. A significant incident which cannot be swiftly resolved will require the re-organisation of priorities at a functional level within the Business Units, and is likely to require the mobilisation of support services.	Company Incident Management Team (CIMT)
Crisis	A crisis is a rare event causing severe and sustained disruption to acceptable service levels and potentially, a significant risk to public health. It will invariably involve risks associated with reputation and value for the company. A crisis will require the re-organisation of company priorities and may involve interaction with external Category 1 and 2 Responders as defined by the Civil Contingencies Act 2004.	Directed by the Crisis Management Team (CMT). CIMT will focus on operational resolution of the incident.

The drivers for incidents are continuously monitored by our control room in Bradford through telemetry systems and collection of information from customer contacts. The operation and integrity of the potable water and sewer system is continuously monitored. In the event of an incident, call information will be received in the Service Delivery Centre. The Duty Manager (DM) will escalate this response as appropriate. At this point, the control of the incident will shift from the local operational level to the DM who will assume the role of the Incident Manager (IM). The DM/IM will oversee the response to the incident until it is resolved or escalated to the Company Incident Management Team (CIMT). The formation of the CIMT will be agreed with a Senior Manager. Following agreement, the DM/IM will coordinate the initial membership of the CIMT and handover to the Senior Manager to manage the incident from this point onwards. The Senior Manager will inform the appropriate director and agree whether to escalate the incident to crisis level – which would then operate under a Crisis Management Team (CMT). The CMT will be chaired by the Chief Executive or a delegated authority. All incidents and emergency communications should be directed by the communications team through the CIMT or CMT as relevant.

After each incident, a 'hot debrief' is undertaken before the incident is deemed as closed. Where incidents have been categorised as significant, a significant incident review is undertaken with all stakeholders within four weeks. We provide five case studies of such events below, where key lessons learnt have been documented and actioned.

Case Study A: Beast from the East – freeze/thaw event 2018

We consider the period between the 26 February 2018 and 11 March 2018 as managing events rather than business as usual. During this period of adverse cold weather, most of our customers' issues were due to frozen private supplies or isolated bursts on our network. A full and detailed report on this incident has previously been provided to Ofwat and is included in Appendix 2. We identified the drivers of the service issues in advance, acting in November 2017 adopting a state of preparedness for a severe winter. On 21 February 2018, the long-term weather forecast suggested a reasonable to high possibility of severe weather at the end of February 2018. We modelled the water production capacity to ensure we could continue to supply water to the region even if there was a significant increase in demand because of a freeze/thaw event and increased levels of bursts. In anticipation of the event we:

- Created a 10-day incident team resource plan to cover all impacted and required functions of the organisation.

- Provided additional customer service roles in both our control room and contact centre to provide increased 24/7 support.
- Increased strategic storage levels across the water transmission network.
- Provided 24/7 resource at seven key water treatment works to reduce the likelihood of any production loss.
- Secured 300 leakage inspectors for the immediate aftermath of the thaw and to distribute bottled water.
- Made ready 200 network repair and maintenance teams to be primed ready to respond to the impact of the thaw and reduce demand / leakage.

As detailed in Appendix 2, one of the key lessons learnt from the event was to fully utilise all modes of communication with our customers, including social media. We use Facebook to notify customers of impacting events such as water outages. We acknowledge that we cannot rely solely on our digital channels. We will continue to use our traditional media effectively along with the deployment of our customer service incident vehicle during events to act as a central hub for customers in the locality.

In its review of industry performance during the 2018 freeze/thaw event, Ofwat acknowledged we were one of the better performing water companies. The incident management plan was fully utilised during this time. The acknowledgement from Ofwat was attributed to:

- Our use of real-time information and monitoring systems to identify and manage issues.
- Our resilience in being able to increase production and move water to where it was most needed.
- Our effective governance processes with clear escalation routes through the company and key external stakeholders.

Our upper quartile leakage strategy will further enhance our capability to respond to similar incidents in the future. For example, our deployment of permanent acoustic loggers in Distribution Management Areas (DMAs) with known high break out levels will enable us to respond rapidly to bursts and leakage. Our data improvement strategy will, amongst other things, enable us to identify DMAs that are susceptible to summer breakouts due to ground movement, a trend seen in the summer of 2018, and improve our ability to target potential problem areas proactively. Our innovation programme, particularly our Intervention Enabling

(Smart) Networks pilot study (explained in our PR19 plan, Chapter 14) will further enhance our ability to respond quickly and efficiently to future incidents.

Case Study B: 2015 Boxing day floods

A period of heavy and sustained rainfall across Yorkshire began on 29 November 2015. By 1 December many of our raw water catchment impounding reservoirs were full and groundwater conditions became saturated. Rainfall continued to fall for several days leading to a sustained period of wet weather escalation across both clean and wastewater sides of the business. The Environment Agency issued Flood Alerts and Flood Warnings primarily for the West and North regions of Yorkshire across the first week of December 2015.

A companywide Company Risk Management Team (CRMT) was set up on 2 December to manage the emerging wet weather operational asset and customer risks and the flood alleviation and mitigation plans. The CRMTs initially ran twice daily to monitor the risk and set trigger points, and continued to operate up to 18 December. Following the heavy rainfall that started at lunchtime on Christmas Day the CRMT was re-instated early on Boxing Day and quickly escalated to the CIMT on that morning (in accordance with the escalation procedure outlined in Table 1).

The scale of the floods, the speed at which they developed, and the warnings of their imminence and timing, being over the Christmas period, had a significant impact on our response.

CEDARThree limited, a firm of crisis management specialists, undertook a review of our response to this incident. The output of the review of our response during and after the event was largely positive. However, as with any major incident there was much to be learnt. The post incident review highlighted key areas for review and development, as summarised in Table 2.

Table 2 – Incident review key areas of focus (2015 Boxing day floods).

Area	Key areas of focus
Data	Develop a fuller understanding of all our data to enable more informed decisions.
Response Plan	<p>Access to documented measures, processes, procedures and plans is pivotal for the readiness, response and recovery of a region wide incident.</p> <p>Develop scenario and asset contingency plans that are accessible to the operational field teams allowing them to move from the reactive to the proactive phase.</p> <p>Develop plans for widespread flood management and customer support.</p>
Training	Develop a progressive training programme for all levels of the response process (CMT, CIMT and CRMT). Training will include individual training, workshops and exercises. The aim is to develop a unified, consistent approach when responding to incidents with a clear understanding of roles and responsibilities at all levels.
Media management	Decisions made must consider the possible media, including social media, impact. Such as what will this decision mean for our customers and how will it be viewed? Ensure there is a clear and well-argued reasoning behind the decision

Case Study : Prolonged dry weather - Summer 2018

The prolonged dry weather in Summer 2018 posed a significant challenge to all water companies within the UK and tested our resilience to ensure continuous water supplies. Our network optimisation processes were fully tested to ensure that no area within our region was subject to the enforcement of a hosepipe ban. This was achieved by optimising all our production resources (borehole, rivers and reservoirs) demonstrating the resilience of our processes, ensuring that our customers were able to receive a continuous supply of water.

We understand that due to climate change the exceptional drought of 2018 may become more common place. We have instigated a programme to work with the Environment Agency to further improve resilience. Approximately 40 actions have been identified through joint working, these have been grouped into 8 projects:

- Complete a full 'end to end' review of our Drought Plan, to include the permit process, environmental monitoring, operational and capital responses.
- Develop a cross-team resource structure with accountabilities tied into the Drought Plan
- Develop operational and maintenance plans for infrequently used assets to improve our resilience.
- Provide visibility of tailored data sets to direct and enable informed Drought Plan decisions.
- Managed regulator and external stakeholder relationships.
- Visibility of asset availability and risk, the ability to see water availability.
- Review known river abstraction, compensation flows, movement of water licences with operational needs to avoid the requirements for permits.
- Clean Water Strategy, to include our grid, water treatment and transition.

In our response to action YKY.PD.B2 we provide excerpts from our action plan.

Case Study D: Water quality incident – Thorne (July 2016)

We received a report from a business property notifying us of a presence of discolouration, taste and odour in their drinking water. An investigation was initiated and the issues appeared to be quickly resolved. We were unable to confirm the source of the reported issues and discolouration, taste and odour issues then recurred. Samples of the drinking water were found to contain high levels of faecal indicator organisms.

A CIMT was initiated and advice not to drink mains tap water was provided to 3,648 properties in the locality. The source of contamination was identified and disconnected from our supply. Health protection advice remained in place until sufficient confidence was obtained that there was no ongoing risk to consumers.

Following our incident management process, we identified that the root cause was cross-contamination from a food processing factory. The incident review identified the following recommendations to prevent a similar incident occurring in the future:

- Review the service for issuing written advice to customers. The emphasis should be on the out of hours and weekend service, and stock items held.
- Review the communications method, with the aim to reflect the relevant medium to the demographic of any incident.
- Review the frequency of updates to the Drinking Water Inspectorate (DWI).
- Review the postcodes and zone information to ensure that in the event of an incident a detailed list of affected customers can be provided at short notice.
- Promote the requirement for businesses to notify us of alterations of pipework.
- Promote the use of WaterSafe registered plumbers through an external communications campaign.
- Work collaboratively with the Water Regulations Advisory Scheme to highlight the issue within the sector.

These case studies demonstrate that we successfully utilise the incident management process across a range of incidents to ensure swift and safe outcomes for our customers and the environment. We proactively attempt to pre-empt the drivers of incidents by analysing the root cause of previous incidents and set up a CRMT to mitigate any risks before they become incidents. In all cases, undertaking a review of an incident to gather lessons learnt has been invaluable and instrumental in the development of the initiatives for our upper quartile programme. Further detail on this is provided in our response to YKY.PD.B2.

Customer communications and support

We recognise and value the importance of good customer communications and support throughout the incident management process. In Ofwat's 'Out in the cold' report, our advance contact, use of customer segmentation and geo-targeted posting were highlighted as examples of good practice for communication with customers and key stakeholders. We were pleased with this recognition but continue to make improvements to our procedures and capabilities. Below we highlight elements of our approach to communicating and supporting customers, including how we have learned lessons from previous incidents to develop our approach further.

Household customers

Providing timely and frequent updates to customers during incidents is key. Our digital channels are primed to provide updates as and when information flows through our central control room with a dedicated resource to manage this. Updates are made available on an area map function on our website homepage, and we provide updates through social media channels. Depending upon the nature and scale of the incident we will set up a dedicated incident webpage and circulate it as a central point of information to customers, stakeholders and the media.

For customer impacting events such as water outages we use targeted Facebook adverts. This pushes the messages to our customers' Facebook feeds, ensuring we provide a trusted source of information that customers are more likely to see.

We use a social media listening tool called Brandwatch, it identifies key themes, so we can tailor our communications to address these themes. If we see posts in social media groups about incidents that need addressing, we have a network of colleague ambassadors in different geographical areas of the region who help feed updates into the social media groups. During a recent water supply interruption our Brandwatch tool identified conversations on local Facebook groups, we engaged via these groups to disseminate our messages.

We know we cannot just rely on our digital channels to provide incident management updates to our customers. Utilising traditional media effectively, establishing key contacts in communities to disseminate messages and using our voice messaging capabilities to send messages to landlines, enables us to target customers who do not use digital media. We use our strong relationships with traditional media outlets to share updates and information

about various incidents, as well as working with local resilience forums, politicians and third sector partners who can directly share our messages with our mutual customer base. This approach is further aided during incidents through the deployment of our customer service vehicle, which acts as a central hub for customers in the locality to interact with.

In our control room, we have a team that focuses on proactive customer communications during incidents. This team coordinates our proactive text message system, our targeted social media advertising and provides updates to customers during incidents.

We have a dedicated specialist team that ensures we have a consistent 24/7 customer service provision across our customer contact channels. The team, created during the freeze/thaw event in 2018, is available to help support customers during incidents. The team monitors and manages our social media channels, our online 'report a fault' facility and customer inbound phone traffic.

Tailored service to customers

We serve a diverse community in Yorkshire and we know some of our customers need extra help from us. We have been using customer segmentation data to understand who our customers are and how they prefer to be contacted. We have utilised this information to inform our approach to incident management. It helps us to better understand customers in the area and assess the levels of likely specific need, so we can make more informed decisions around how we communicate.

We have championed a vulnerable-led approach to managing incidents. Learning from the freeze/thaw event in 2018, we have further developed our approach proactively contacting our customers who may need extra help from us. This approach, utilising data from our Priority Services Register (PSR), is now business as usual when responding to any customer impacting event.

Our operational coaches provide support and training to our operational field teams, developing their customer service skills to improve the doorstep experience for customers.

We have dedicated colleagues available to visit customers who may need extra help from us. We work very closely with local authorities and local resilience forums to identify customers with additional needs and provide them with an alternative water supply or additional support if required.

Business customers and Retailers

Following the freeze/thaw event in 2018, we have taken several steps to improve the service we provide to business customers and Retailers, recognising the industry-wide feedback that it was an area for improvement. We have focused on ensuring we have consistent, timely and regular communication with Retailers and business customers during service impacting events.

We are making it easier for Retailers to work with us by improving our mapping and data systems so that we can provide impacted postcode and Supply Point Identification details to Retailers quickly during an incident. This will then make it easier for Retailers to pass relevant information on to their customers during incidents, and plan their own responses as relevant.

We are creating an incident communication strategy for business customers and Retailers to help improve the service we provide. In December 2018, we hosted a good practice communications workshop, so that we could share our learnings with other wholesalers and receive feedback from Retailers on areas of improvement. This has helped us to improve how we communicate to business customers and Retailers during incidents.

During the extended hot and dry weather over the Summer 2018, we presented useful advice on our website for how business customers could save water. We welcomed Retailers sharing this information with their customers across our region and elsewhere.

For specific localised events, where we believe business customers may be impacted, we liaise with Retailers using email and telephone. Where a business customer is classed as particularly sensitive to a loss or degradation of water or wastewater service, whether under the Security and Emergency Measures Direction (SEMD) regulations or to be compliant with the Wholesale Retail Codes, we act promptly and directly with the customer to mitigate the impact of an event and keep the customer's Retailer informed.

Our business customer management team has worked alongside other wholesale companies and Retailers to create an 'Unplanned Events and Incidents' good practice guide. The purpose of the guide is to provide standardisation and clarity for both Retailers and Wholesalers in relation to unplanned events and incidents.

The performance gap between current and future performance

To provide a summary, we present the performance gap between current and future performance for our upper quartile programme measures and Drinking Water Quality Contacts. These stretching targets were proposed, consulted on and agreed with our customers as part of the PR19 submission and refined in our post IAP response. These targets have been fully communicated to the business and a dedicated programme exists to ensure the required step change in performance. We provide detail on how we will deliver the performance step change in our response to YKY.PD.B2 as well as how continuous improvement will ensure the continuation of this improvement throughout the 2020-25 period.

YKY.PD.B2

Throughout 2020-25 our primary approach to continuously monitoring incidents performance will be through our incident management practices and procedures governed by our Company Incident Management Policy (described in our response to YKY.PD.B1). While the principles and techniques we use are tried and tested, we recognise the value of reviewing our policies and procedures. We are currently updating our Company Incident Management Policy, this will be completed by the end of 2019. As discussed in YKY.PD.B1, our Company Incident Management Policy will continue to enable the effective capture of performance drivers and lessons learnt, allowing us to continually implement performance improvement measures.

In this action response we demonstrate the detailed planning undertaken to deliver and manage the stretching improvements from current performance by expanding on the measures within our upper quartile programme and our Drinking Water Quality Contacts performance commitment. Our customers have told us that these are the some of the areas that matter most to them and contain some of the greatest performance stretch.

We have included detail on how, through harnessing expertise inside and out of the sector and our continuous improvement practices, we will enable sustained and controlled performance improvements. These practices will both help identify performance drivers and act as a conduit for implementation of performance improvement measures.

In response to this action we have also included several action plans relating specifically to incident management and customer support during incidents. Developed through post-incident reviews, these plans are already progressing.

The Fit for Future Plan

Fit for Future (FFF) is the name of our plan to prepare our business for the 2020-25 period and beyond. The outcome of the plan, once fully delivered, will be a transformed business that is equipped to realise our Customers' 5 Big Goals¹ and our PR19 commitments. The FFF Plan includes initiatives that are specifically designed to create and embed a learning culture, enabling us to quickly learn from our successes and failures before effectively

¹ <https://www.yorkshirewater.com/biggoals>

implementing at pace the changes needed to improve and monitor the performance of our business and the services we provide to our customers.

How we will deliver targets

Our PR19 plan delivers exceptional improvements in service while keeping bills low, now and into the future. Work is already underway to deliver the performance step change.

Below we explain how we will deliver and manage the improvement in performance for the key upper quartile measures and our Drinking Water Quality Contacts performance commitment. Table 3 summarises the performance gap between current and future performance.

Table 3 – Performance gap – as submitted in Data Table - App1 on 1 April 2019 IAP Response

Area	17/18 (Actual)	18/19	19/20	20/21	21/22	22/23	23/24	24/25
Leakage (MI/d)	296.4	297	269	255.6	242.1	228.7	215.2	201.8
Customer Minutes Lost (ave mins per property)	06:12	06:00	04:00	03:36	03:12	02:48	02:24	02:00
Pollution (nr)	226	216	174	129	125	122	119	116
Internal Sewer Flooding (nr)	1709	978	582	401	386	372	358	345
Drinking Water Quality contacts (nr per 10,000 population)	14.2	13.1	12.2	11.3	11.3	11.3	11.3	11.3

Upper Quartile Programme

As part of the PR19 process, we have set challenging targets for key performance measures. These proposed targets were submitted as part of our PR19 plan in September 2018 and updated in our IAP response in April 2019. We are seeking to become upper quartile in three areas (leakage, pollution and internal sewer flooding) and frontier in supply interruptions measured by customer minutes lost.

The upper quartile programme was developed and approved by the Yorkshire Water Board in November 2017 to improve performance in these areas. The programme aims to achieve the upper quartile targets at the start of the 2020-25 period. Thereafter the achievement of the upper quartile targets transitions towards business as usual activity, where continuous improvement activities will ensure that the targets for future years are achieved. The targets

for upper quartile performance are set for each year until the end of the 2020-25 period. Details of the programme and associated actions plans are provided below.

Governance

To achieve the step change in performance for the start of the 2020-25 period, a dedicated programme has been set up, with its structure identified in Figure 2. The programme is sponsored by our Chief Executive. The plan to deliver the improvements against each performance commitment includes a series of projects, detailed in the following sections.

Leakage and customer minutes lost have dedicated programme boards while pollution and internal sewer flooding are managed through a single programme board, the escapes programme board. The accountable senior managers that chair these boards report to the directors at the upper quartile steering group. In turn, this forum reports to the Chief Executive at the sponsoring group. All these forums meet monthly. The outputs of the Sponsoring Group are summarised and form part of the monthly Yorkshire Water Board Report.

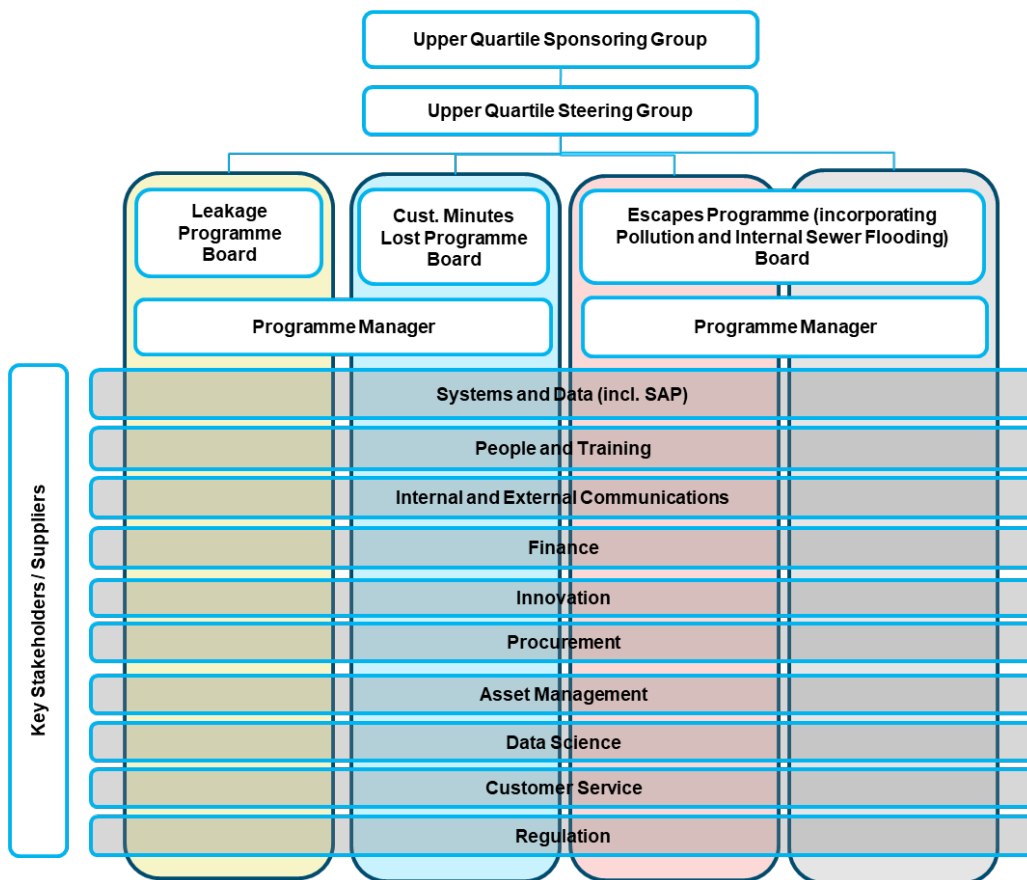


Figure 2: Upper Quartile programme governance structure

Key projects

There are over 50 projects in total within the upper quartile programme with each project either enabling or providing a direct benefit.

Leakage programme

The leakage target was amended as part of our IAP response in April 2019; the rationale for which is detailed in 'IAP Response YKY.OC.A1-A52: Delivering outcomes for customers' and reflects that we are committed to leakage reduction over the next 6 years.

Our performance in reducing leakage is highly susceptible to incidents such as the freeze/thaw event in 2018 or the exceptionally dry summer of 2018. Such incidents may impact on customer service but can also deflect us from our target leakage glide path and put our leakage performance commitments at risk. To mitigate this risk, we maintain a forward-looking approach, forecasting our expected leakage outcome each year to the end of the 2020-25 period based on planned resources, activity levels and assumptions about weather related impacts (breakout) derived from the last ten-years of actual performance data.

Our strategic leakage forecasting tool enables us to consider more extreme weather scenarios in order to understand how activity may need to be increased if atypical weather events become more frequent in future. Our forward forecast is updated on a regular basis as we work through the delivery of our plan, reflecting actual performance to date and taking account of improved data and insight into some of the underpinning productivity assumptions behind our model.

The strategy will be formally reviewed annually to provide an updated view of the risk to our leakage performance commitment and will enable us to determine whether we need to increase future activity levels or resources in order to achieve an acceptable level of risk. That annual review will also take account of the individual workstream benefits assessment to enable us to identify which specific activities should be increased in order to maximise the efficiency of our leakage reduction.

A high-level view of the leakage programme is provided in Figure 3, which highlights the key delivery and innovation projects within the programme.

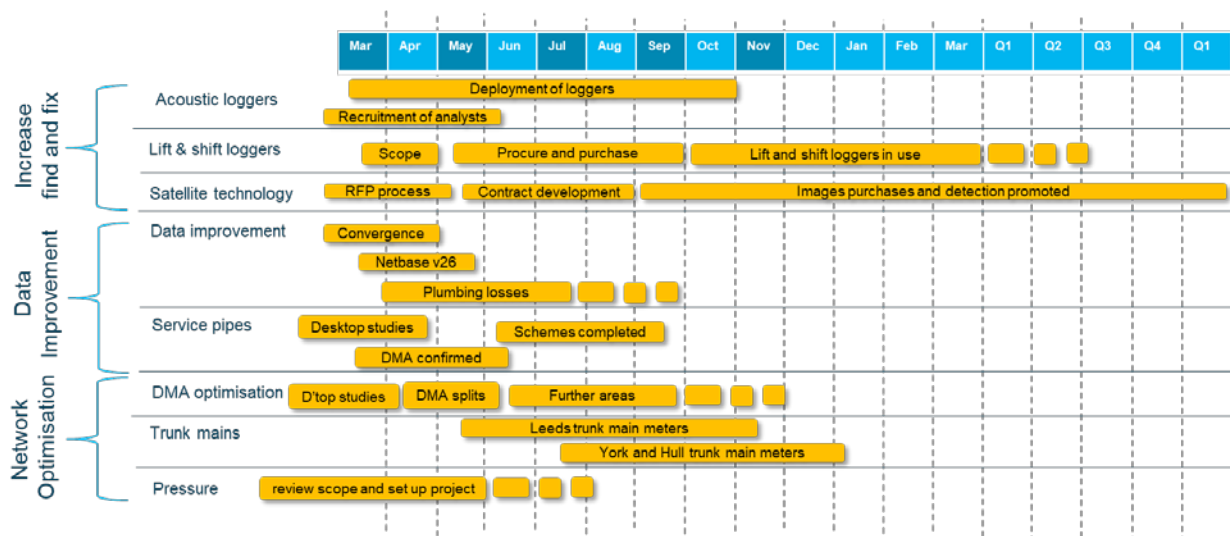


Figure 3: High level leakage plans (from March 2019)

Increased find and fix

One of the initial changes we implemented to reduce leakage was to increase the leakage technician capacity across the region and to obtain guarantees from our partners that rectifying work would be completed in a timelier manner. This was undertaken at the start of 2018/19. Following this, more enabling initiatives have been mobilised. These include the deployment of 38,000 acoustic loggers and the use of satellite imagery to detect leaks.

The technology projects will enable the technicians to be more effective in identifying leaks and the detection of them. Careful consideration has been given to the locations of the acoustic loggers to target the poorer performing DMAs for leakage. The information provided by acoustic loggers will support the organisation in major incidents and situations of leakage breakout due to severe weather, as well as providing support in more effective active leakage control.

Data improvement and innovation

The second key element of the leakage programme is to improve the way that leakage is reported and measured as part of the annual performance report. This will include validation of the key assumptions used as part of the reporting. We have recruited additional data analysts to ensure that benefits from related projects are realised. One of the key areas that is being investigated is the effect of soil moisture deficit on leakage. We are constructing a detailed map of our region that will be used to proactively detect areas of raised leakage during prolonged periods of dry weather.

Network Optimisation

We aim to reduce leakage on service pipes. Using desktop studies and local experts we will identify key areas. Further investment into pressure release valves (PRVs) and flow loggers across the network will ensure that excess network pressure is reduced with the aim to lower leakage and bursts. The PRVs were used actively to reduce customer impact during the 2018 freeze/thaw event and are now being used to improve water supply resilience through our DMA optimisation programme. We will implement trunk main metering in key areas.

Supply Interruptions - Customer Minutes Lost

A high-level view of the Customer Minutes Lost programme is provided in Figure 4.

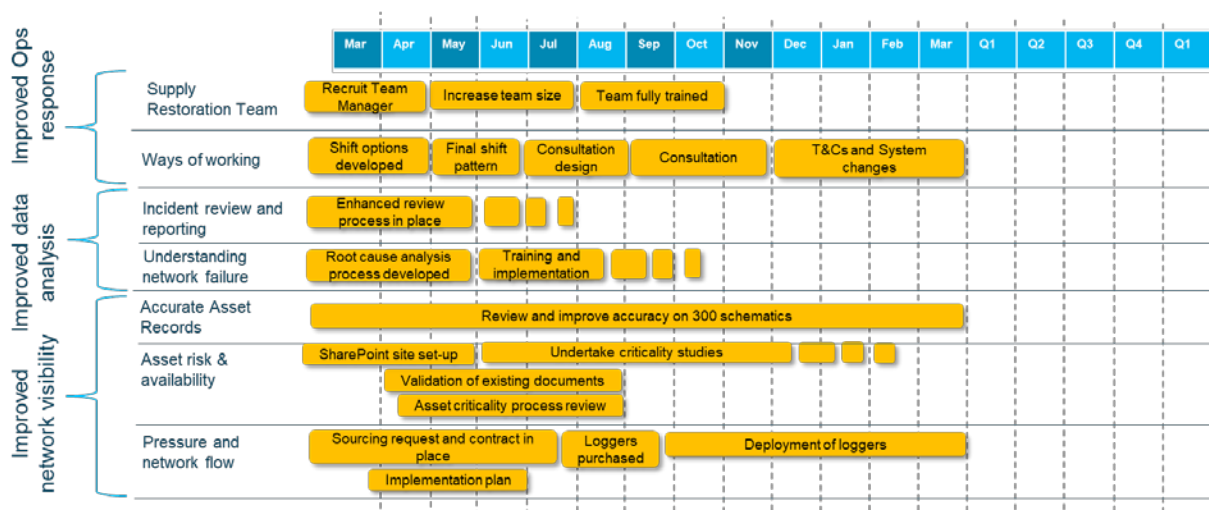


Figure 4: Customer minutes lost programme (from March 2019)

Improved Operational Response

As part of the drive to reduce customer minutes lost, we have recruited a number of engineers to provide 24/7 support to our control room which will strengthen network experience and knowledge. This will ensure that key network intervention decisions are made and communicated to the field teams to minimise the number of properties affected by an interruption. They will help optimise incident response times and to reduce the impact of network failure on our customers. This has already been implemented and positive results have been seen in early stages of 2019/20.

We have focused on improving technician capability through two key initiatives:

- We have developed and are delivering a hydraulic training course for all our network operators.
- We have introduced a dedicated training role within the network teams to further enhance the technician skills and competency framework.

We have created a restoration team. The team provide a dedicated restoration activity to complement our operational field team and help reduce the size and duration of interruption events through for example, the deployment of tankers and overland supplies.

Improved data analysis and planning

To ensure that key learnings are taken from reviews of past interruptions to supply, we have increased the resource in our analytical team. They undertake detailed reviews of past and current incidents. We carry out root cause analysis on all incidents to understand the critical factors that contributed to the size and duration of the event. Through this we better understand the casual factors of network failure that will inform future improvement initiatives. The critical factors and the key drivers to supply interruption durations are used to improve processes and inform technician training.

Planned events also impact on customer minutes lost, and we plan to remove 95% of all resulting impacts by creating a planning team. To ensure a consistent and optimised approach to the delivery of planned work we are centralising the migration of key planning activities.

Increased network visibility

There are two key initiatives forming part of network visibility:

Improve accuracy of schematics: Ensuring that all network information is accurate and up to date on all corporate systems and available to our operational teams is key. This will ensure that our operational field teams have the right network information when out in the field, to make sure they have a clear understanding of incident impact and how potential options to resolve. We have a target to review and update 300 schematics each year

- Enhanced deployment of pressure management loggers: Pressure loggers will provide increased network visibility. This was identified as a major factor in supporting the early detection of network events and providing in-event and post-event information.

The procurement process is currently being undertaken with expected completion in July 2019. This will enable the deployment of new loggers by 31 March 2020.

Escapes programme

The escapes programme incorporates the improvement in pollution and internal sewer flooding. The high-level plan is provided in Figure 5.

Pollution

A high-level view of the pollution programme is provided in Figure 5.

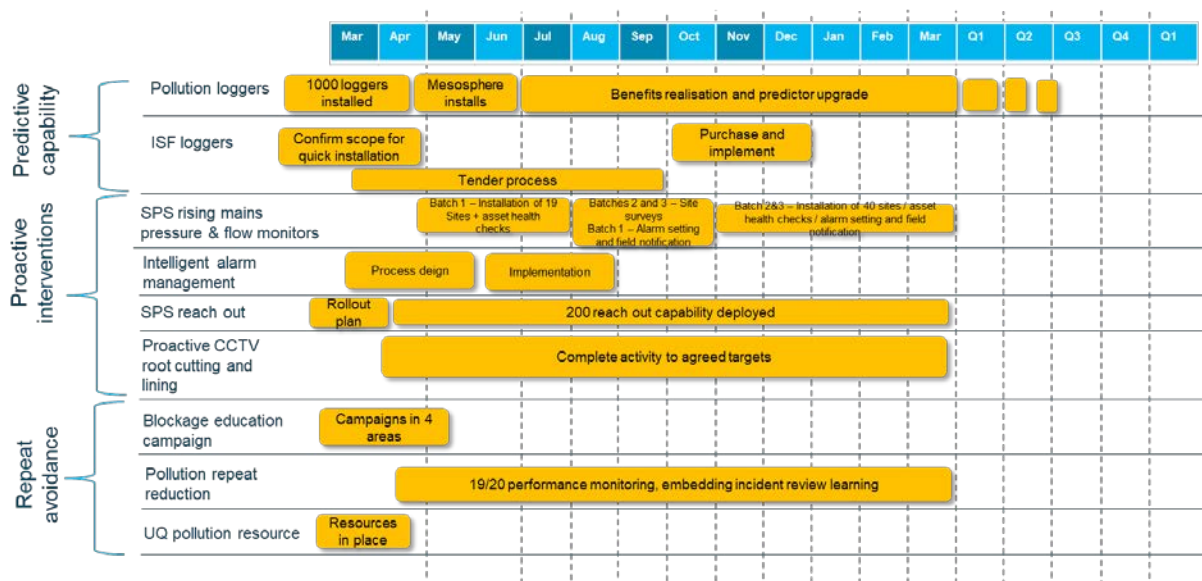


Figure 5: Key elements of the pollution upper quartile programme (from March 2019)

Predictive capability

As part of the upper quartile programme, there are accelerated initiatives to increase network visibility. Pollution loggers have been deployed, these are being used to identify pollution incidents before they occur.

Proactive interventions

Alongside the additional pollution loggers, we are increasing the ‘reach out’ technology capability is being deployed. This will enable more critical assets to be controlled from the central control room, for example resetting tripped pumps resulting in a faster resolution time. To enable defects to be identified and blockages averted we surveyed 200km of our sewer network in 2018/19. We plan to survey a further 280km in 2019/20. This will ensure any pollution incidents are mitigated and that the challenging target can be achieved.

Repeat avoidance

Up to 25% of pollution incidents repeat, improving our network pollution report process (NPR), completing root cause analysis of repeat incidents and developing proactive interventions will reduce this figure to a target maximum of 7% in 2020. One of the key aspects of pollution is blockages resulting from non-flushable wipes. We have increased our customer campaigns to educate our customers not to dispose foreign objects down the toilet. The most recent of these campaigns is ‘wipesaur’². This has been a successful campaign, with over 80% of customers surveyed committing not to flush any foreign objects down the toilet.

Internal Sewer Flooding

A high-level view of the pollution programme is provided in Figure 6.

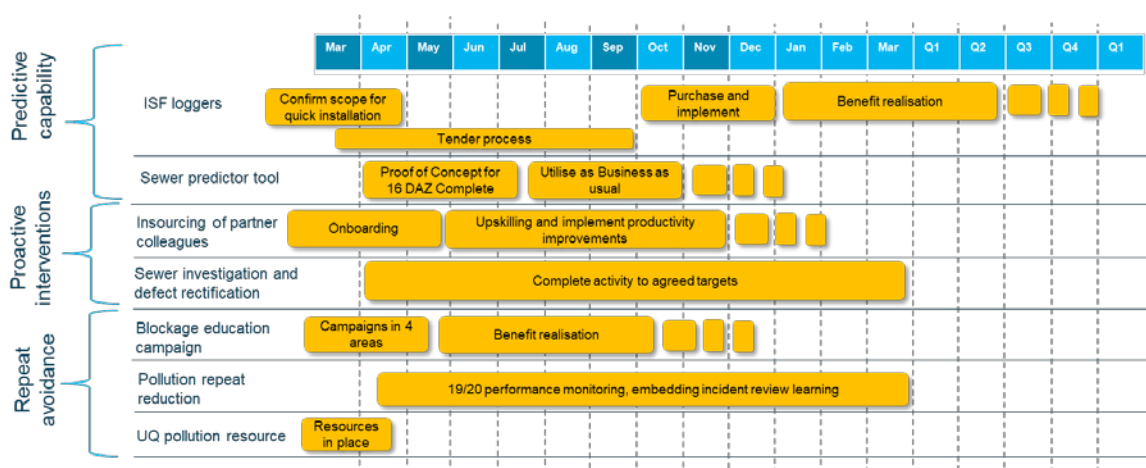


Figure 6: Key elements of the internal sewer flooding upper quartile programme

Proactive capability

Like the improved visibility that is being undertaken for pollution, there will be an additional internal sewer flooding (ISF) loggers deployed across the Yorkshire region by March 2020. These loggers will provide an alert in advance of a flooding incident. They will be deployed in areas that are at greater risk of flooding and those that have been identified as repeat incidents. This proactive alert will allow our engineers a window of opportunity to attend the area and mitigate any flooding that might occur.

² <https://www.yorkshirewater.com/blockages>

The information gathered from the ISFs loggers will form inputs to an analytics engine. This will optimise all the information that is currently being transmitted into the control room from the telemetered sites across the sewer network. The analytics engine will predict blockages taking into consideration past performance and forecasted weather patterns. This information will form part of a new triage model that will enable informed network intervention. This will ensure that we reduce the number of flooding incidents and in turn associated customer contacts, and the dreadful impact that internal flooding has on our customers.

Proactive interventions

We are increasing the number of sewer surveys and associated defect fixes. 100,000 internal flooding at risk properties were surveyed in 2018/19 with a further 160,000 properties being surveyed in 2019/20. Following on from these surveys, over 4,000 defects were rectified in 2018/19. Our target is to address nearly 6,000 defects in 2019/20.

Repeat avoidance

40% of internal sewer flooding incidents have been from repeat incidents. Root cause analysis and process improvements have reduced this number. The repeat incident rate is currently 15% for 2019/20. These process improvements, along with customer campaigns will support the drive to achieve our upper quartile targets.

Water Quality Contacts

Since the start of the 2015-20 period, water quality contacts have reduced by over 30% in comparison to the final year of the previous period. Despite a challenging year for weather conditions a small reduction has been seen in the contacts in 2018/19, and these will be published as part of the Annual Performance Reporting in June 2019. We have set a target of 11.3 contacts per 10,000 properties across the majority of the 2020-25 period, a further reduction of 21% in contacts from the reported figure in 2017/18 (based on the PR19 AMP7 PC definition).

In the current period we have embarked upon a number of improvement initiatives; the principal initiative being the creation of a Distribution Maintenance team to deliver a proactive DMA flushing programme in our highest risk areas of the network. The team has proactively flushed in excess of 2000 DMAs since its creation, removing historical sediments that can cause discolouration of water supply. The team has helped to reduce discolouration contacts by nearly 2,000 within the current period.

We plan to further optimise our flushing programme at DMA level to improve its effectiveness, working with expert external partners and interested stakeholders. We also intend to increase the scope of our activity to include the trunk main system, where we know much of our discoloration material originates. We are currently undertaking significant technical investigation work on our high risk trunk main systems with the intent to reduce discoloration risk by 'conditioning' them to safely support expected flow rates.

In addition, we know we need to reduce mobilisation events where historical deposits of discoloration material is disturbed through increases in flow within our network. One way we will do this is through increasing the awareness and technical capability of our network operators. We have developed a new Hydraulic Training package which we will roll out to our teams and will continue our Calm Networks awareness programme for all Yorkshire Water and service partner teams.

Linked to the additional training, a proactive visible valve status initiative will be undertaken to ensure that all network valves are correctly positioned, recorded and made visible for all operators. We have recently introduced a new Emergency Risk Assessment process that supports operators to risk assess emergency operation of the network. The creation of a new operation engineer team based in our Service Delivery Centre enables us to assess the water quality risk of any potential operation or incident and optimise our response to reduce the impact on customers. The role also provides an authorisation route for our higher risk work. In addition, we are looking to further enhance risk assessment to reduce mobilisation events.

Another key initiative is our plan to improve the way we provide information on potential drinking water issues to customers. Around 15% of contacts from customer regarding water actually relate to 'milky water'. The milky appearance is simply caused by air bubbles creating a cloudy appearance and milky foam at the surface. In this case, through simple but effective visual content on our website, we are able to educate the customer and reassure them their water supply is no risk to health. We believe there is more that can be done to improve our provision of information and we will be carefully monitoring the learning from the 'wipesaur' campaign in order to identified further improvements.

Learning from others and seeking evidence and insight from within and outside of the sector

To deliver our stretching PR19 targets we will be reliant on innovation. As described in our PR19 plan, we target innovation through 'people and culture', supply chain and R&D innovation. Focusing particularly on 'people and culture' and supply chain innovation, we consistently seek evidence and insight from within and outside of the sector and will continue to do so throughout the 2020-25 period and beyond. In this section we expand on how we will harness innovation to identify performance drivers, assist the capture of lessons learnt and implement improvement measures.

People and culture innovation

We recognise that there is further opportunity to embrace a culture of innovation at Yorkshire Water, but we reiterate that learning from others has become a core capability and approach. We make best use of our industry networks and seek insight from individuals within and outside of the sector to solve known and unknown problems.

An example of this included in our PR19 plan is the development of our 'Openness Charter'. Through this we have made more of our data available to allow those from outside of the organisation and sector to use cutting-edge analysis techniques to help solve problems with new and innovative techniques. Through an open data hackathon new approaches to data visualisation of sound have been developed to help us detect leaks more efficiently.

Through further, partnering with Open Data Leeds, we are making sludge treatment facility data more readily available to stimulate the market and help identify areas for improvement and efficiency that may benefit customers in the long term.

We are seeing the benefits of making our data more readily available than ever before. This will continue throughout 2020-25.

Supply chain innovation

Our approach to securing innovation through the supply chain allows us to gain evidence and insight into what is technically possible and best practice of the day. We do this by clearly articulating our needs to partners, rather than our desired solutions. This encourages partners to use their expertise and provide innovative solutions. For our key performance measures, our innovation team are focusing 80% of their time on innovative technologies that will support upper quartile performance in AMP7.

Working with others

We appreciate the value of collaboration in sharing evidence and insight. We already have a performance commitment that requires us to do just this; our Working with others performance commitment. We forecast to strongly outperform during the current period and are stretching ourselves again during 2020-25 to deliver even more partnership projects.

With the commitment to deliver 45 partnership projects, we will harness evidence, expertise, and resources from our partners to deliver the most effective and efficient solutions during 2020-25. These projects benefit from enhanced monitoring and control, through all partners, ensuring the best possible outcomes for our customers and the environment.

Our strategic planning partner

As well as our plans to continue using evidence and insight from those inside and out of the sector, the appointment of our Strategic Planning Partner, Stantec, is introducing a structured pathway. Stantec's global exposure and vast experience across water and wastewater sectors internationally provides us with an avenue to global best practice techniques and intelligence. The close and embedded relationship created by this partnership is already adding value to contracting strategies and commercial models by challenging traditional thinking. As this relationship matures we expect to secure further insight and benefits.

Continuous improvement

To ensure that the actions detailed above are not a 'one-off' step change, we have set up a dedicated team to develop and enhance continuous improvement across the organisation. We have several continuous improvement teams across the company who have been working together over the past two years to create a common sense of purpose and a 'Yorkshire Water Method' for approaching and implementing improvements. We have founded this method on our Business Process Management (BPM) framework and external best practice, such as systems thinking and Lean Six Sigma. As with BPM, this capability is not about having a team of change project managers and analysts who undertake improvements on behalf of teams, but rather works shoulder-to-shoulder with teams to coach them through a process of learning, understanding and designing improved ways of undertaking their work.

With wider benefits such as improved colleague engagement, morale and skills development, this way of approaching the learning organisation – being prepared to learn about the work we do in a more holistic way and providing a platform for teams to create and implement ideas has already started to deliver results and is being deployed across our upper quartile programme.

We are working with Professor Bob Garrett, who is one of the foremost thought leaders in creating 'Learning Organisations'. Professor Garrett is continuing to work alongside key colleagues, such as our Transformation Partner, and our executive leadership team to undertake learning reviews in a different way and embed a culture of continuous learning.

We are focusing our efforts on key strategic change programmes to ensure we capture areas of opportunity for future programmes. Learning from past events, performance and failures is not new to us; we run post-project lessons learnt and incident reviews as a matter of course. We aim to continuously learn from our activities and the environment within which we operate.

Our continuous improvement methods will ensure that we retain an ongoing focus on reviewing and improving our approach to managing incidents, supporting customers, delivering stretching targets and identifying measures to improve performance.

Summary action plans

In this section we provide examples of the action plans we have in place to monitor and improve our performance in incidents and major incidents, including providing improved customer experience through communications and support. The purpose of providing these examples is to provide an overview of the type of activity we are undertaking to ensure we deliver a great, efficient and resilient service to customers at a price they can afford.

Critical to our sustained performance improvement is the ongoing update to our Company Incident Management Policy, due for completion in 2019.

Dry weather action plan

Below we highlight excerpts from our action plan that resulted from the joint lessons learnt review we held with the Environment Agency following the prolonged dry weather (PDW) in Summer 2018.

Project	Activity Area	Activity
Full 'end to end' review of Drought Plan (incl. permit process, environmental monitoring, operational & capital responses etc.)	Comms	YWS to review timing and nature of water saving messaging that is given to customers for future PDW.
	Comms	Both YWS and EA to review effectiveness of internal comms, identify weak points and develop solutions to improve for future PDW incidents.
	Drought Plan	Review triggers in YWS drought plan at a local level to ensure appropriate (worked well regionally).
	Drought Plan	Review compensation flows and control lines to create a more flexible and environmentally sustainable approach that may help provide flexibility to avoid the need for future drought permits to be applied for.

	Drought Plan	Review drought plan and ensure it is appropriate for a winter drought as well as a summer drought.
	Drought Plan	Clarify winter permits and link to dry summer, not just to low winter rainfall.
	Drought Plan	Explore options for incorporating demand triggers into drought plan as opposed to only supply triggers.
	Drought Plan	Review prolonged dry/hot period actions documented in drought plan.
	Incident Readiness	YWS to raise the profile and understanding of their drought permit internally across the business to facilitate buy-in during potential future PDW period.
	Incident Readiness	YWS/EA teams to seek better alignment on principles of water quality monitoring/mitigation so that these are known prior to any future PDW incident.
	Permitting	Review triggers for when drought permit pre-app work commences (based on triggers in YWS drought plan) and opportunities for making the process shorter (EA and YWS)
	Other	TUBS. Discuss with Water UK evidence for/against tubs e.g. comparison with impacts from social media use. Water companies will need to put forward compelling evidence if want to try and influence current tubs requirements in drought plans: - methodology not appropriate - use social media - pre-requisite to summer permits
Operational & maintenance plans for infrequently used asset (resilience pumping	Drought Plan	Review current understanding of Yorkshire area supply resilience and grid limitations following PDW learning 2018.

stations, not 'Drought pumping stations).	Incident Readiness	EA to develop a better understanding of YWS operational processes / grid system help better assess potential options for managing future PDW.
Visibility of tailored data sets to direct and enable informed Drought Plan decisions (triggers, catchment rainfall, bathymetric, etc.)	Comms	Use 'days left' trigger for early discussions with field staff to facilitate decision making.
	Incident Readiness	Where possible baseline data required for Environmental appraisal reports (EARs) is collected and shared between both organisations so it is already available should a future PDW incident occur.
Managed regulator and external stakeholder relationships	Comms	Consider the use of webex or equivalent for YWS/EA telecons so everyone can see documents that are being talked about.
	Comms	Put in place plans for identifying likely stakeholders and consulting with them early, prior to submitting drought permits, to reduce the risk of challenges.
	Incident Readiness	Develop process to put in place clearer communication channels earlier in the process should a future PDW incident occur (earlier comms - RACI for YWS / EA teams & also 'no surprises' around individual reservoirs)
Visibility of asset availability and risk (able to see water availability, but not which assets are oos or if the asset is optimised).	Permitting	Review flow trials and consider making formal variation to include in licences if appropriate.
	Permitting	Consider options for building more flexibility into current YWS licences - variable compensation release - abstraction reform opportunities, etc. Review opportunities and consider making formal variation to include in licences if appropriate

Freeze/thaw event action plan

Following the 2018 freeze/thaw event our incident reviews identified over 30 key recommendations. We carefully prioritised the recommendations and started to embed them. Following instructions from Defra to focus on those recommendations related to emergency preparedness, have identified and confirmed the following actions:

YWS Improvement	Details
Greater visibility of local severe weather plans.	The Severe Weather plan launched Nov 2018 covering all severe weather types. Plan viewed at audit, see section 4.1
Work with other utilities to create multi-agency, multi-failure plan.	The Multi-agency Multi-failure plan launched summer 2018 on RD. Plan viewed at audit, see section 6.13
Work with LRF's to identify highways to critical assets.	List of key sites with LRF's & Highways Agency to ensure access is maintained in place July 2018, confirmed at audit. New YWS gritting contracts & self-help gritting equipment with new guidance & great capability in place. Review of 4x4 vehicles & contract hire for business-critical activities completed.
Improve planning principles for major incidents.	Ability to now deliver 1 million litres of water via bottles/Arlington tanks, see section 3.4, 6.1, 6.2.
Update contractual and logistics arrangements.	Wincanton contracts updated, new supplier of bottled water, tender for bottled water delivery due post April 2019 (includes innovative solutions for priority customers & improved response times), see section 6.1, 6.2, 6.7.
Create a communications strategy for non-household customers.	Workshop and exercise undertaken Nov & Dec 2018 with Retailers and other wholesalers. Response framework now being written by Water UK.
Improve communications for business 'sensitive' customers.	Wholesale Service Desk responsible for emails & calls direct to Retailers when business customers affected. Confirmed at audit & included in CIMP.
Work with other wholesalers to share good practise.	Industry wide document now included on MOSL website and viewed at audit.
Provide a consistent customer service provision & improve proactive communications for customers.	New Customer Service Event Coordinator role in control room to proactively manage PSR customers, see section 6.7. New outbound text messaging system to create bespoke incident messages, implemented as BAU in Nov 2018 with CSEC staff & confirmed at audit.

Launch an online fault reporting tool.	Launched during freeze/thaw for customers to report leaks, busts & sewage monitored by 24/7 customers service team. Viewed at audit.
Champion a 'vulnerable led' approach to incidents.	Includes proactively contacting PSR customers, new segmentation tool to understand customer's specific needs and target communications, actively promoting PSR register, see section 6.7.
Provide timely updates to customers during incidents.	Use of digital channels to provide regular updates, use of homepage & dedicated incident webpage for customers, stakeholders and media, confirmed during audit.

Customer experience action plan

Below we highlight an elements of an action plan currently being delivered to improve customer experience, particularly regarding incident management.

Initiative	Summary	Anticipated Implementation	Customer Experience Improvement
Dedicated Customer Incident Management Framework	Dedicated customer framework to form an integral part of the wider company incident management framework. This will detail a sustainable and consistent approach in light of our recent restructure to form Customer Experience, Water Service Delivery and Waste Water Service Delivery. Incorporates golden hour interventions for customers, site response and use of our onsite customer vehicles, communication framework (internal & external), Customer Service standby provisions, approach to vulnerability and escalation processes to manage customer contacts across all platforms and channels consistently.	Q3 2019/20	Improved levels and consistent communication with customers across all channels at times of an incident Improved onsite customer experience with dedicated service teams 24/7 resilience with our service provisions Priority service customers managed by dedicated resources and vulnerability understood and prioritised Targeted and personalised service levels. Using customer demographics for incident areas we can tailor our approach to work with customers and communities

<p>Dedicated Customer Focused Significant Reviews</p>	<p>Company level incident reviews are carried out as standard following large scale customer impacting events (Emergency Planning team led). Customer experience forms part of these sessions as standard but we are now carrying out dedicated deeper dive workshops to really challenge and continuously improve customer experience and our own people experience. Lessons learnt are fed back through our governance framework to collaboratively improve our company response as a cross business group. Current and recent examples being two CCWater notifiable events in Wrenthorpe and Meltham where we are tackling areas of improvement linked to our bottled water response, proactive customer communication and capture of customers to the Priority Service Register.</p>	<p>Live</p>	<p>Continual improvement based on customer insight, feedback and root cause analysis of failure to remove the risk for future events Customer experience is demonstrated as everyone's role here at YW, not just a single department</p>
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<p>Proactive Customer Communication Platform</p>	<p>Replacement of current legacy systems to create a single platform for proactive customer communication across all channels. Currently this is delivered by numerous systems with various standards of performance which opens us to inconsistency, time delays and gaps in service when we need to reach and communicate with our customers most. Insight and reporting will be more dynamic, ensuring our approach is dynamic and real time in line with changing circumstances throughout incident management or in the onset on an emerging risk.</p>	<p>System being scoped. Agile methodology used so incremental benefits may be possible prior to full solution procurement. Anticipated implementation in 2020/21.</p>	<p>Quality, consistent and timely communication in a way that customers wish to be communicated with Reduction in customer effort targeted and personalised service</p>
<p>24/7 Customer Experience Provision</p>	<p>Implemented following the period of escalation linked to the 'Beast from the East' we now have a dedicated customer service team as part of our central control pod. This provides a service professional available by phone/social channels when our customers really need us the most. The team focus on proactive customer management for out of hours emerging incidents to ensure we are 'ready' for</p>	<p>Live</p>	<p>Right first time response, reduced customer effort, service professionals with enhanced training capabilities, quality of operational service consistent 24/7-365 and critical focus on vulnerability and our priority service customers</p>

	when Yorkshire wakes up and support with reactive customer issues in our out of hours service provision.		
24/7 Duty Operations Engineer & Continuous Supplies Team	Links to Water Service Delivery UQ funding - Implementation of dedicated engineering resource as a 24/7 provision within the central control room team. Providing technical support from the centre, understanding alarm handling and translating this to minimise interruptions to supply and quality of incident management response working with the various teams involved in resolution of customer impacting events on the water network. The team work collaboratively with our new continuous supplies provision in seeking out all opportunities to ensure we have no impact or a reduced impact to water supplies and service during incidents on our clean water network	Live	Proactive monitoring of the network and dynamic working from the centre to prevent and reduce customer impact Works as an integrated 24/7 function with the customer experience teams accountable for customer management and proactive communication so removes silo working and ensures a consistent customer experience Ultimately a 'silent service' for customers as impact will be removed or reduced

Two Way Text	Two way text messaging capability currently being piloted by our Operational Customer Experience Teams. Opportunity to extend this capability once out of pilot period across our wider customer journeys and customer touch points linked to wider initiatives under our 'Drive to Digital' stream through the Customer Experience Programme	Pilot live since 8/5/19	Personalised service levels through channel of choice by the customer Reduction in customer effort Quality of communication and overall experience
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