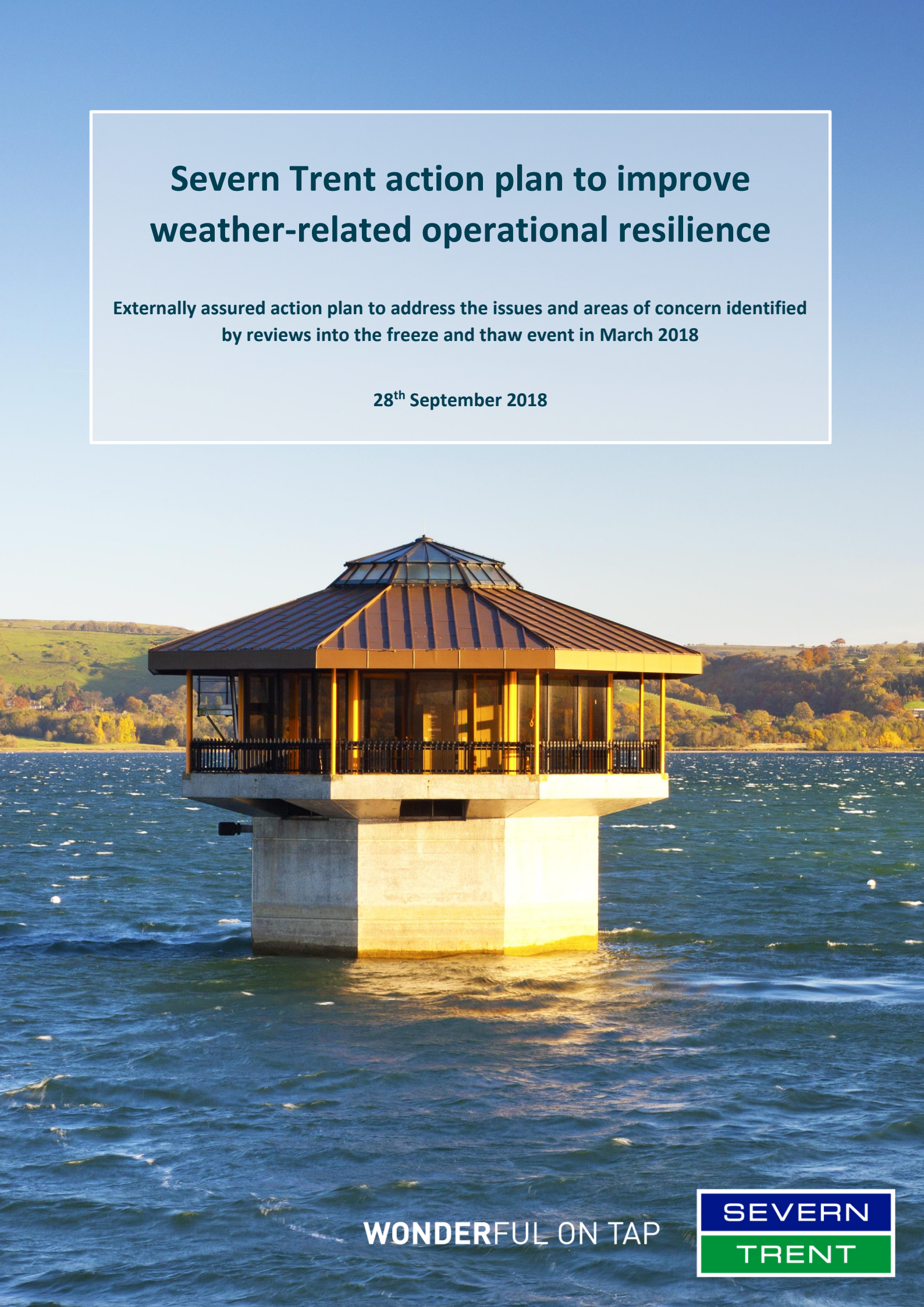
Severn Trent action plan to improve weather-related operational resilience

Externally assured action plan to address the issues and areas of concern identified by reviews into the freeze and thaw event in March 2018

28th September 2018



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1. Introduction

1.1. Context

As the provider of an essential public service our customers quite rightly expect us to be able to avoid, cope and recover from a wide range of weather and other scenarios, recognising that "extreme" could be the new "normal" and that historical experience and trends may no longer be a reliable guide for the future. Our communities, whether rural or industrial, also expect that we will engage with them to co-create cost-effective solutions that will protect the environment and best fit their needs.

We know that we could have done a better job for our customers in our preparations for and response to the freeze and thaw event in March 2018. We have sought to make sure that we have learned from our own experience and that of other companies. We have also looked at best practice abroad in Denmark and Singapore and at home in the energy and airline industries.

The purpose of this response is to address the sector-wide and Severn Trent-specific concerns raised by Ofwat's "Out in the Cold" report – but we have also taken the opportunity to consider our operational resilience more broadly – so that our customers can trust us to deliver a reliable service to them, whatever the circumstances.

We have approached our desire to improve our resilience through risk-based quick win, medium and longer term interventions including:

- **Improving the reliability and health of our network** and assets to ensure that they operate at or close to their design maximum during extreme weather events;
- **Increasing the capacity of our network** to establish more headroom between average and peak demand through increased water production capacity, increased storage capacity, greater connectivity between assets and freeing up pinch points to unlock network flexibility;
- **Reducing demand for water in our system**, for example through stretching leakage targets and associated initiatives and investment such as the installation of 35,000 acoustic loggers (which will also improve our predictive modelling and network control);
- **Increasing technical resource and capability** through additional personnel, a refresh of the technical skills of operational front line roles and investment of c. £10m in a new training academy which we anticipate will be built by the end of 2020 (and which we intend to make available to smaller water companies for the benefit of the sector as a whole);
- **Better preparing for incidents**, for example by updating our emergency plans and escalation triggers and improving visibility of what's happening across our network;
- **Improving our incident response** including our tankering operations and provision of alternative supplies, with £7.7m of AMP6 efficiencies committed for investment;
- **Developing tailored communications strategies** for specific customer groups, including improving communications with our non-household customers and retailers;
- **Improving our identification of vulnerable customers** (including customers experiencing transient vulnerability) and implementing a wider Priority Service Register; and
- **Accelerating our recovery from incidents** through minimising and managing backlogs and engaging with customers and stakeholders.

We have used our enterprise risk management process to assess the risks to our resilience: gross (uncontrolled with no mitigation); current (the reduction in likelihood and impact resulting from our actions and their effectiveness); and target (the desired improvement considering risk appetite and

cost effectiveness of control). This ensures that we understand where risks are being well managed and effectively prioritise our risk mitigation plans.

But we have not developed our plans in isolation. Our approach has been informed by extensive engagement and testing with our customers, communities and wider stakeholders. We have sought to understand what our customers want and expect from us in terms of what they already pay for in their existing bills and what they are willing to pay for to deliver improved resilience. We made extensive use of deliberative and qualitative and quantitative research as part of our PR19 preparations. Our customers have told us that they accept that it isn't always possible to prepare for every disruption and they recognise that some low probability events are rare/unpredictable and can be costly to avoid, in which case they consider that a response and recovery approach is acceptable. However, disruptions to their service due to our own assets failing is intolerable and when things do go wrong they expect us to resolve them quickly and be aware of their personal needs.

Our aim therefore is that whatever the weather and whatever the event, our customers will not be impacted – but if they are, we will:

- Have better plans in place to anticipate and prepare for events;
- Make sure that they have easily accessible alternative supplies;
- Know who our vulnerable customers are throughout the duration of an incident and deliver supplies directly to them;
- Keep our customers informed across a wide range of tailored communications channels;
- Provide personalised care and support, recognising that our customers' needs may change over the course of an event;
- Recover our service as quickly as possible, with minimal disruption; and
- Deliver prompt, no quibble and appropriate compensation.

Our plan has been independently assured by Jacobs. It has the support and approval of our Board and the ongoing supervision and monitoring of its implementation is set out in Section 5 of this report.

1.2. How we have developed our plan

Our plan to improve our operational resilience reflects our and others' collected learnings from the freeze and thaw event and other weather-related events. We have conducted a comprehensive review, not just into our performance during the freeze and thaw event, but also into our operational resilience to weather-related events more broadly. The process began when we launched an internal review immediately after the freeze and thaw event (before Ofwat launched its sector-wide review).

Key inputs to our plan's development have included:

- **Internal review and root-cause analysis:** Immediately after the freeze and thaw event we launched an internal review into its root causes and our handling of it. We conducted a programme of structured, in-depth interviews with key personnel from across the organisation who were involved in the event and/or are relevant to broader operational resilience.

- **Ofwat's review:** Our action plan addresses all of the recommendations made by Ofwat, both in its 'Out in the Cold' review, which sets out its expectations for the industry as a whole, and in its specific letter to us.

- **Customer engagement:** Directly following the freeze and thaw event (and before Ofwat launched its review), our Chief Executive and other senior executives met and spoke with a number of directly affected customers and stakeholders so that we could hear about their experiences first-hand. Since then we have continued to actively engage with customers to test and refine our thinking as we have developed our plans.

- **Customer research:** We conducted a range of qualitative and quantitative customer research following the freeze and thaw event, to help us properly understand what happened from our customers' perspectives. Immediately after the event we issued a survey to all potentially impacted customers using our 'Pipe Up' platform, and received 6,500 responses. We also analysed customer research conducted by the Consumer Council for Water (CCWater). Finally, we tested elements of this action plan through further customer research with c. 500 customers.

- **Stakeholder engagement:** We have proactively met and/or shared draft action plans with a range of key stakeholders including CCWater, Customer Challenge Group (CCG), Drinking Water Inspectorate (DWI), Local Resilience Forums (LRFs), local Councils, Retailers, Emergency Services and the National Farmers Union (NFU). These discussions were invaluable in helping us to strengthen our plans, in particular around how we collaborate and communicate with our customers, communities and stakeholders during events and incidents.

- **Industry reports:** We have reviewed a number of relevant industry reports including CCWater's 'Water, Water Everywhere?' report into delivering resilient water and wastewater services; DWI's consolidated review of the freeze and thaw event; the National Infrastructure Commission's 'Preparing for a Drier Future' report; and the Northern Ireland Utility Regulator's 'Report of the investigation into the freeze/thaw incident 2010-11'. These reports have helped us to consider the broader context of the freeze and thaw event. Our action plan aims to address the relevant issues and learnings identified in them.

- **Industry collaboration:** We have (and continue to) actively collaborated with and learnt from other water companies, both via Water UK-led discussions and bilateral conversations with companies who have experienced and addressed similar challenges. The Water UK discussions held through their freeze and thaw Steering Group (which we sit on) have been a helpful way to engage with industry-wide challenges such as mutual aid, bulk supplies and supply pipe ownership, where joined-up thinking and consistent approaches are particularly important. Where these discussions are ongoing, our action plan will be updated to reflect their conclusions when they are finalised.

- **Other sectors and international experience:** We looked beyond the UK water industry to learn from other sectors including energy and transport; and other countries/regions including Singapore, Denmark and Northern Ireland. Our plan reflects a number of things we have learnt from these companies and countries that we consider to be best practice.

Our action plan has been developed in parallel with our PR19 submission, which includes an overarching summary of our approach to operational, corporate and financial resilience in the 'Securing Long Term Resilience' chapter. The two plans are fully consistent, and we have included a brief summary of this action plan in our PR19 submission. The key distinction between the two plans is that the 'Securing Long Term Resilience' chapter in our PR19 submission is a comprehensive summary of our plans to improve our overall 'resilience in the round'; whereas this action plan focuses specifically on improving our resilience to weather-related events.

1.3. How we have structured our plan

We have structured our plan to improve our operational resilience around Ofwat's helpful 'Avoid, Cope, Recover' framework:

- **Avoid:** Reducing the likelihood of operational resilience incidents arising, mainly through balancing supply and demand
- **Cope:** Mitigating the impact of operational resilience incidents by responding to them quickly and effectively
- **Recover:** Resuming normal customer service following an operational resilience incident quickly and effectively

In Sections 2-4 of this report we set out our plans to improve our operational resilience in each element of the Avoid/Cope/Recover framework, both in relation to future cold weather events and other weather-related events. We also describe the actions we've already taken to ensure we are better prepared for potential weather-related events this winter.

By implementing the actions set out in this document we are confident that we will reduce the likelihood of future weather-related events becoming incidents; and be better prepared for and equipped to deal with those that do. In doing so, we will provide our customers and stakeholders with full confidence in our operational resilience.

2. Avoid

2.1. Overview

Where economically viable, reducing the likelihood of incidents arising is the best way to secure operational resilience, because it provides the most effective protection to our customers. In this section we describe our plans to reduce the likelihood of incidents arising in five key areas:

- Improving reliability: Operating and maintaining our assets effectively to ensure their reliability under a range of conditions
- Increasing capacity: Ensuring our system has sufficient headroom, interconnectivity, responsiveness and back-up arrangements to maintain services in the event of disruptions
- Reducing demand: Reducing and optimising overall demand for water in our system to reduce the stress on our assets
- Improving predictive modelling: Using improved operational data to enable more accurate 'what if' analysis and scenario planning; and faster responses to potential events and incidents
- Enhancing resources and technical capacity: Ensuring we have sufficient resources at our disposal and highly skilled and experienced resources throughout the organisation

2.2. Improving reliability

The freeze and thaw event highlighted the importance of designing, operating and maintaining robust mechanical and electrical systems that are able to withstand shocks such as extreme weather events. We are focusing on three specific areas:

- **Mitigating single points of failure:** During the freeze thaw event, we suffered loss of supply as a result of a burst at our Breamfield Reservoir in Derbyshire. This reservoir has two 12" feeds and was therefore thought to have sufficient resilience. However, on this occasion, one of the 12" inlet pipes burst which resulted in the pumps at the water treatment works failing. In order to minimise similar failures in resilience, we have assessed all of the c. 1.3 million pipes in our network and identified ten individual large pipes that, if they suffered a burst, could cause a loss of supply for more than 24 hours (at average water demand). Plans are now being developed to improve the resilience of these pipes. In addition, we have conducted deep-dive reviews into those areas of our network that we know are most prone to failure. These reviews and plans to improve their resilience have been shared and agreed with our Executive Committee.

- **Strengthening processes/procedures:** During the freeze and thaw event and recent hot weather, we trialled new safe ways to increase the output from some of our water treatment works. These new modes of operation are now being built into our operating standards.

- **Protecting our assets against power fluctuations:** While we have already installed back-up generators in key sites to ensure continuity of power supply, our broader review of operational resilience identified an issue with power fluctuations potentially causing waterworks to shut-down due to sensitive control systems. As a result we are revisiting our power resilience schemes to consider whether uninterruptable power supplies (UPS) or generators can be fitted to protect against these fluctuations.

2.3. Increasing capacity

The freeze and thaw event and our effective management of the recent hot weather highlighted that building greater spare capacity into our network may be prudent, in particular through establishing more headroom between average demand periods and peak week demand. There are a number of ways we can do this, including:

- Putting more water into our system, for example by recommissioning old boreholes (which we successfully achieved in a very short timescale during the recent hot weather at Ladyflatte) and reviewing current abstraction licences
- Maximising output and building additional capacity at our water treatment works
- Growing our distribution network storage capacity, especially in rural locations at the edges of our network
- Establishing greater interconnectivity between assets, to make it easier to move water around the system and enable us to apply systems thinking to operational resilience
- Freeing up pinch points to unlock network flexibility

Many of these interventions can involve reasonably significant capital investment, and it is important that our investment decisions strike the right balance between cost and outcomes. However, the growing frequency of weather events is beginning to challenge our current design standards and indicates that some level of additional investment may be necessary. We are carrying out sensitivity analysis on our supply/demand balance to confirm the expected ranges remain valid.

We have undertaken a structured review of potential schemes to build greater capacity and flexibility into our network and assets. Schemes prioritised as a result broadly fall into three time horizons:

- Short-term: Schemes that we will implement in the next 6 months
- Medium-term: Schemes that we will implement in the next 6-18 months
- Longer-term: Schemes that we will implement in over 18 months

Over the next 18 months we are looking to increase available treated water capacity by 100 Ml/day and have already committed c.£10m from AMP6 efficiencies to progress and deliver these schemes.

2.4. Reducing demand

The most cost-effective way to avoid extreme weather events becoming operational incidents is to reduce and optimise the overall demand for water in our system. Doing so reduces the stress on our assets and increases operational headroom without needing to create new assets. Having reviewed best practice approaches demonstrated by countries including Denmark and Singapore, we are focusing on reducing and optimising demand in three key ways:

- **Reducing customer demand:** We continue to help our customers to optimise their usage and therefore reduce overall customer demand. Specific initiatives include:
    - ***Radio and TV campaigns:*** We regularly run targeted media campaigns encouraging customers to reduce their water usage. We broadcast our water efficiency TV advert several times a day from mid-July to mid-August.
    - ***Smart metering:*** We are trialling installation of c. 3,000 smart meters in boundary boxes which will give us greater visibility of customer usage. We are focusing initial effort in the Nottinghamshire and Staffordshire areas because of the water balance challenges in those

areas. We plan to increase the proportion of metered households to 65% in 2020-25 (which will triple our current run-rate), and are targeting full metering by 2035.
    - ***Retailers and non-household and customers:*** We are engaging with our retailers and non-household customers on how we can collaborate to reduce overall non-household consumption; and to reduce consumption during periods of peak demand or constrained supply. In parallel with the above, we are working with Water UK to help establish industry-wide best practise in this area.

- **Reducing leakage:** Leakage represents a significant portion of our overall system demand, and making a step-change reduction in leakage volumes is a strategic priority and innovation focus. Key elements of our leakage reduction plans include:
    - ***Acoustic loggers:*** We are installing thousands of acoustic loggers across the network that will enable us to listen for leaks. We have already installed 5,000 loggers and are planning to install a total of c. 35,000 by the end of 2020. Further details of how we are using this data are included in Section 2.5.
    - ***Satellite technology:*** Following a successful pilot, we are now using satellite technology to help us detect leaks by chlorine detection.
    - ***Pressure management:*** We will be rolling out advanced pressure release valve controllers to protect against bursts by reducing the system pressure, reducing pressure transient waves and ensuring that we operate our networks as they were designed.
    - ***Internal trunk mains repairs:*** We are developing plans to put a greater emphasis on proactive maintenance and interventions such as pressure and air valve checks, particularly in known high risk areas. Doing so will ultimately reduce instances of highly eruptive bursts. We are looking at plans to insource internal trunk mains repairs to establish a dedicated focus on maintaining and repairing trunk mains. This would provide an opportunity to establish a deep internal resource pool with industry-leading knowledge and skills on operating and maintaining trunk mains.
    - ***Additional resource:*** We are in the process of securing commitment from our contract partners for additional fix field gangs and leakage find staff.

- **Increasing resistance in our customers' assets:** We estimate that over 70% of the additional leakage during the freeze and thaw event was caused by bursts on the customers' side of the boundary (both household and non-household), primarily due to unlagged pipework. And our customer research suggests that 96% of our customers think that helping customers to reduce bursts on their pipes is either very important or fairly important. As a result we are doing a number of things:
    - ***Campaigns:*** Reflecting Northern Ireland Water's learnings following its freeze and thaw incident in 2010/11, we will run engaging and educative campaigns on the importance of lagging pipes in the winter. We tested new approaches to customer engagement during our recent hot weather campaign which included TV, radio and outdoor advertising; and a range of free water-saving devices. Customer feedback gathered throughout the campaign will inform our winter campaign.
    - ***Incentives:*** We are considering whether and how we could incentivise our customers and supply chain partners to protect customers' pipes.
    - ***Support:*** We are reviewing our policies for supporting customers when they have bursts on their pipes. This is covered further in Section 3.3.

2.5. Improving predictive modelling

While we already monitor large quantities of data from across our network, the freeze and thaw event highlighted opportunities to improve the quality, quantity and availability of operational data. This improved data will help us to forecast and prepare for events with greater confidence; and also to respond more effectively to events as they unfold and develop into incidents.

We are planning to install c. 35,000 acoustic loggers (of which 5,000 have already been installed) and 6,000 pressure loggers to pinpoint leaks by the end of AMP6. We are expecting them to enable a 25% reduction in awareness time and a 15% reduction in locate time.

We are also planning to install 2,350 low-point pressure loggers to identify which customers are affected by supply outages in real-time. During the freeze and thaw event we followed our established process for identifying which customers were off-supply of deploying temporary low-point data loggers to supplement our permanent high-point data loggers. However, the speed and coverage of the thaw meant we had insufficient time and resource to deploy the temporary loggers. We therefore had only limited visibility of which customers within affected DMAs were off-supply. In the absence of robust data to confirm specifically which customers were off-supply, we had to rely on conservative assumptions and made compensation available on this basis. We are expecting the new permanent low-point loggers to provide much greater and timelier visibility on how many customers are off supply, and enable quicker resolution.

We are also developing plans to implement an innovative 'situational awareness' model that will combine advanced analytics and real-time network models to enable demand predictions and therefore resource forecasts that are reflective of works production/outages, distributed service reservoir (DSR) levels/outages and risk appetite. These models will help us to avoid operational resilience incidents by (1) enabling 'what-if' analysis and scenario planning to inform better asset management decisions; and (2) enabling faster responses to potential incidents by identifying early warning signs sooner.

We have already built and rolled out a leakage analytics model that allows us to identify small anomalies in flow and pressure trends, which indicate leaks and their likely location before they becomes eruptive/disruptive. We have also built a water resources dashboard that shows hourly water production volumes; and a solution to automate an alarm triggered by unusual rates of change in our Control Groups and DSRs (rather than having to manually monitor our 144 Control Groups and 540 DSRs).

2.6. Building technical capacity

Protecting and growing our technical capacity is an ongoing strategic priority, and the freeze and thaw event was a useful reminder of the importance of having highly-skilled and experienced technical employees throughout the organisation.

A key element of our strategy to build technical capacity is to invest £10m from AMP6 efficiencies in establishing a training academy to provide our employees with access to technical training and development throughout their careers. Our vision is to create a sector-leading centre of excellence to make our workforce the most technically skilled in the industry. The academy will deliver a broad curriculum of technical training in-person and virtually through a combination of classroom, practical and simulation methods. The curriculum will be finalised next year and we are planning to complete the physical academy by the end of 2020. We intend to make the facility available to smaller water companies for the benefit of the sector as a whole.

3. Cope

3.1. Overview

A significant proportion of our shortcomings during the freeze and thaw event related to our performance in coping with it (i.e. as distinct from avoiding it or recovering from it) and mitigating its impact on our customers. We have structured our plans in this area around the five themes used by Ofwat in its review:

- Planning and preparation
- Incident response
- Communications
- Vulnerable customers
- Compensation

3.2. Planning and preparation

We recognise that we could have prepared better for the freeze and thaw event; and could have acted sooner to escalate its supervision and management as it became an incident. We have prioritised the following areas for improving our planning and preparation for events (many of which have already been implemented):

- **Refreshing annual plans to prepare for upcoming seasons:** While we already follow an annual plan which sets out routine actions to prepare for upcoming seasons, our discussions with other water companies have highlighted that some follow more granular month-by-month plans. This was also identified as a key improvement opportunity by Northern Ireland Water following its freeze and thaw incident in 2010/11. We are updating our plans to reflect this approach, which we believe will help us to prepare more systematically for upcoming seasons – starting with this winter. In parallel, we are reviewing our internal processes and operational procedures to ensure that the plans are adhered to. Further details of our ongoing governance arrangements are included in Section 5.3.

- **Improving the visibility of what's happening across our network:** As described in Section 2.5, we are planning to install thousands of new loggers to improve the quality and quantity of data on our network. We are also developing plans to implement an innovative 'situational awareness' model that will help us to identify and respond to incidents more quickly and with greater confidence.

- **Updating our incident triggers:** One of the main issues identified through Ofwat's freeze and thaw review was our lack of specific triggers for freeze and thaw events. We have already developed a draft plan and a wider range of triggers (see below summary of new freeze and thaw triggers), and are now consulting on them with relevant stakeholders, including LRFs, emergency services and supply chain partners. As well as establishing an incident response plan and triggers for freeze and thaw events, we are also reviewing our existing plans and triggers for other events to determine (1) whether they are still fit for purpose; and (2) whether there are any other potential events we need to create plans and triggers for. Based on our learnings from other organisations including Northern Ireland Water and Heathrow Airport, we are also reviewing the protocols that our triggers set in motion to ensure that they anticipate worst-case rather than 'average' scenarios.

Summary of freeze and thaw incident triggers

- Operational Bronze: Where the average rate of change (freeze/thaw) is up to ~8C+ within a 24-hour period after 3 days of below-freezing temperatures
- Operational Silver: Where the average rate of change (freeze/thaw) is up to ~8C+ in over 24 hours after 5 days of below-freezing temperatures
- Tactical: Where the average rate of change (freeze/thaw) is up to ~8C+ within a 24-hour period after 8 days of below-freezing temperatures

- **Updating operational meeting rhythm:** Following the freeze and thaw event we updated our operational meeting rhythm so that we now review and discuss indicators of potential weather-related events more frequently and with a wider audience. The revised rhythm (which is already being followed) is summarised in the following table:

Meeting/Report	Frequency	Description
Situational Awareness report	Daily	Received by the Network Control manager – provides details of job queues, weather forecast, state of reservoirs and any bursts
Network planning meeting	3 per week	Review of weather triggers, longer-term weather forecast, demand and supply triggers, resourcing and any issues with specific areas/counties
Network Control management meeting	Weekly	Review of performance for the week; covers a wide variety of measures such as performance of controllers, live new project roll out, people issues and live issues
Production Director management meeting	Weekly	Review of leading indicators of operational performance
Executive Committee report	Weekly	Summary of key operational performance metrics
Sector-wide Network Control Forum Meetings	Quarterly	Provides a formal opportunity for us to share information and best practice with other water companies

- **Engaging with non-household customers:** We are offering free site inspections to our largest non-household customers ahead of this winter to review their current winter preparedness including storage/back-up arrangements; and propose potential improvements and contingency plans. We are also ensuring that key data is up to date for all our non-household customers (including sensitive and vulnerable customers such as hospitals, prisons, care homes, schools and farmers), including 24-hour contact details, meter information, average daily consumption, storage options and location of tanker connection filling points.

- **Refreshing plans with Local Resilience Forums (LRFs):** Feedback following the freeze and thaw event reinforced the benefits of good collaboration with LRFs before, during and after events and incidents; and highlighted inconsistencies in the extent and effectiveness of our engagement with LRFs across parts of our region. As a result we have spent a considerable amount of time working with LRFs to strengthen our incident plans with them, including reviewing and confirming the best location for bottle stations; preferred communications channels and frequencies; and the optimum trigger points at which we alert them to potential incidents. Further details of how we engage with LRFs are included in Section 3.4.

- **Updating incident standby rotas:** Following the freeze and thaw event we reviewed opportunities to make our incident standby rotas more robust for future operational incidents. Key opportunities identified included redefining lead roles; identifying appropriate individuals to fill them; and providing training where necessary. These are now being implemented.

- **Deepening our 'reserve' resource pool:** The freeze and thaw event highlighted the challenges with rapidly mobilising resources to handle spikes in activity. We already have an extensive network of external partners that we use to secure temporary resources at short notice, and are looking to bolster this in two specific ways. First, we have been trialling the use of temporary staff for non-technical roles including manning bottle stations and monitoring social media. Second, learning from the British Airways response to the Heathrow enquiry we are exploring the potential to establish a 'reservist' workforce comprising retired and ex-employees.

3.3. Incident response

Aspects of our incident response were good during the freeze and thaw event, but we have prioritised five specific areas for improvement:

- **Improving our provision of alternative supplies:** Our management of alternative supplies during the freeze and thaw event was largely good for the majority of our customers. However, we have identified opportunities to improve in the following areas:

    - ***Sourcing alternative supplies:*** Our sourcing of alternative supplies during the freeze and thaw event was effective. We have a rapid response service level agreement with our supplier, which means that we can make bottled water available to our customers within 10 hours (or 7 hours for vulnerable customers), versus the Security and Emergency Measures Direction (SEMD) requirement of 24 hours. Our contract guarantees 300,000 litres/day, which ensures SEMD compliance for the first 72 hours of an incident. In addition, we have one million litres of water on rotational storage. We are currently considering whether to increase our guaranteed daily volume to 500,000 litres, which would ensure SEMD compliance for the first 120 hours of an incident (an increase of 48 hours). In line with our standard commercial practices and ongoing focus on continuous improvement, we plan to review our alternative supplier options when our next contract break comes up. Our focus will be on ensuring that we have the very best arrangements in place for our customers and that they represent best value for money.
    - ***Industry collaboration:*** While we are broadly comfortable with our own alternative supply arrangements, we recognise Ofwat's observation that more coordination on alternative supplies between water companies would be beneficial. We are pleased to be on the Steering Committee of the Water UK response to the freeze and thaw event, and are actively participating in the work stream focusing on this issue.
    - ***Rural customers:*** During the freeze and thaw event we learnt that large, centrally located bottle stations in rural locations, which were theoretically accessible by large numbers of customers, were in practice difficult to reach for many customers, especially in bad weather conditions. We have subsequently updated our procedures to place greater emphasis on working closely with LRFs to identify the best locations for bottle stations; and also to be more proactive in setting up stations in anticipation of need. This worked well during the recent hot weather and sets us up well for this winter.
    - ***Non-household customers:*** During the freeze and thaw event, we did a good job providing alternative supplies to hospitals, care homes and prisons, but identified opportunities to be more proactive with liaising with schools and farmers. During the recent hot weather we

were also much more proactive in providing bottled water to schools and bowsers to farmers, and have had initial discussions with the NFU on how we could work more collaboratively with farmers in future incidents to 'help them help themselves'. We are also working through Water UK to develop industry-wide guidance on how retailers, wholesalers and business customers should work together to identify and develop water storage solutions on customers' premises.

Case study: Kniveton Primary School

As an example of our more proactive approach, during the recent hot weather we provided bottled water, portaloos and catering to Kniveton Primary School in Derbyshire in anticipation of a supply outage which was subsequently avoided.

Commenting on the support we provided, the school's head teacher said *"…I can't praise them enough…they really have gone over and above".*

- ***Vulnerable household customers:*** Our overall approach to vulnerable customers, including the provision of alternative supplies, is covered in Section 3.5.
- ***Communications:*** During the freeze and thaw event there were instances when staff manning bottle stations were not fully briefed on the situation and were therefore unable to respond effectively to customers' queries. For future events we are implementing a formal process for cascading key messages to bottle station teams.

- **Improving tanker operations:** We are investing £7.7m from AMP6 efficiencies in strengthening our response to incidents. We are still finalising our plans but, for instance, our tanker capacity could grow by c. 100% volume. This would in part be achieved by reducing the number of small tankers (9,000l) and increasing the number of large tankers (30,000l) in our fleet. We are also improving our processes for monitoring tanker movements and are considering creating a new Internal Tanker Team.
- **Reviewing policies for supporting customers when they have bursts on their pipes:** The freeze and thaw event highlighted a need to review our policies on when and how to support customers when they have bursts on their pipes – especially because we estimate that 70% of the leaks arising from the event were on customers' pipes. At present, while customers are generally expected to pay for fixing leaks on their pipes, we will step in and fix customers' pipes on their behalf in specific circumstance including if they are experiencing vulnerability; if leaks are large or involve complex arrangements such as shared supply; or in emergencies when the network's integrity is at risk. We are actively engaging with other water companies to better understand industry best practice; and have embarked on a review of our policy, which will conclude next year.
- **Installing more air release valves to help resolve air locks:** During the freeze and thaw event we experienced issues with air release valves in some rural areas (in particular Breamfield in Derbyshire), which resulted in a number of air locks. Since then we have tested an improved approach to identifying and maintaining these assets and are developing a plan to implement the improved approach in affected areas, starting with Breamfield.
- **Proactively targeting industrial estates and caravan parks:** Several of the water companies we shared best practice with highlighted proactively targeting industrial estates and caravan parks with known leakage challenges as an important part of their response to the freeze and thaw event. By proactively targeting them before the thaw was forecasted to begin, they were able

to significantly reduce subsequent bursts. We are introducing this to our incident response plans in time for this winter.

3.4. Communications

Communicating effectively with our customers before, during and after incidents is essential. Our recent customer research has further reinforced that our customers expect to be kept informed and want quick, simple, informative, warm messages. While aspects of our communications were very good during the freeze and thaw event (Ofwat highlighted our proactive, multi-channel communications as an example of good practice), we are not complacent. Specific actions we are taking to improve our communications with customers, partners and stakeholder during incidents are detailed below. Many have already been implemented. We have also updated our overall Crisis Communications Protocol to reflect these changes.

- **Improving the quality and provision of customer contact details:** We are broadly happy with the quality and provision of our customer contact details, but have identified three specific areas where we need to focus:
    - ***Refreshed communications strategies:*** Where we have refreshed our communications strategies for certain customer groups, we need to ensure that we have the right customer contact details to enable them. For example, in our new communications strategy for rural customers, text messages play a more prominent role.
    - ***Non-household retailers:*** We are working with our non-household retailers to improve our communication with them and our non-household customers during incidents. Part of this is agreeing when and how to share their contact details to enable us to communicate with them when we need to (e.g. to arrange alternative supplies). Our plans are described in more detail below.
    - ***Vulnerable customers:*** We are taking a number of steps to ensure we have more comprehensive and up to date details of our vulnerable customers, including customers experiencing transient vulnerability. This is described in more detail in Section 3.5.
- **Improving our website:** The freeze and thaw event highlighted a need to increase the capacity of our website during events and incidents; and to make more information available to help our customers cope with incidents. We have already put in place a process for temporarily scaling up website capacity when an incident is triggered; and have developed plans to make more incident-related information available on our website, update it more frequently and improve navigation. Planned improvements include improved FAQs and clearer signposting to additional support available from other utilities, charities and relevant organisations.
- **Developing tailored communications strategies for specific customer groups:** Based on our learnings from the freeze and thaw event, we have developed tailored communications strategies for three specific customer groups:
    - ***Rural customers:*** We received feedback that our communications strategy during the freeze and thaw event was less effective for some of our rural customers than our urban customers, especially in Derbyshire. In particular, online communications such as social media reached fewer customers, in many cases simply because of poor broadband coverage. Following the event we met with Derbyshire Council to learn how they communicate with rural customers. They highlighted the benefits of going 'hyper-local'. Our updated rural communications strategy is therefore built around a combination of text, voicemail and local radio. We already have a text- and voicemail-based incident alert

service. We have made it simpler to adopt and will be targeting rural communities with sign-up campaigns, with the support of local councils and other local bodies. Our first trial is currently underway.
    - ***Non-household customers:*** During the freeze and thaw event, we did a good job communicating with hospitals, care homes and prisons, but identified areas for improvement with schools and farmers – primarily around being more proactive in alerting them to and keeping them informed of potential issues. We have trialled a more proactive communications approach during recent bursts, which has been received positively by schools and farmers and sets us up well for this winter.
    - ***Vulnerable household customers:*** Our overall approach to vulnerable customers, including how we communicate with them, is covered in Section 3.5.

- **Leveraging local networks:** Feedback following the freeze and thaw event highlighted the benefits of leveraging existing local networks and community groups in our communications strategy. We put this into practice during the recent hot weather, when we shared all our comms materials and messaging with relevant local authorities and Local Resilience Forum comms teams so that they could share with their local community group distribution lists. We are also leveraging local networks to increase the sign-up to our text alert service. As part of our Derbyshire pilot, we have worked closely with the local Council comms team, who have helped to share and distribute our collateral and messaging to over 1,000 local community groups via their Derbyshire Directory e-newsletter.

- **Improving communications with our non-household retailers and customers:** The splitting out of retail services for non-household customers led to a degree of confusion during the freeze and thaw event. In response, we are working closely with our retailers and non-household customers to establish greater clarity around roles, responsibilities and processes. Specific things we are doing include:

    - ***Non-household customer response matrix:*** Establishing a non-household customer response matrix that formalises when and how we communicate with our retailers and non-household customers during incidents.
    - ***Online Retail portal:*** Improving the usability and building awareness of our online Retail portal, which we use to post updates to our retailers before, during and after incidents.
    - ***Contact details:*** Ensuring contact details and alternative supply plans are in place and up to date for sensitive non-household customers (hospitals, prisons, schools and care homes).
    - ***Text alerts:*** Developing a text alert service for non-household customers.
    - ***Education campaigns:*** Working with our retailers to develop education campaigns for non-household customers.

    In parallel with the above actions, we are also actively participating in Water UK-led discussions to develop industry-wide guidance for how wholesalers and retailers should work together during events and incidents.

- **Collaborating with local resilience forums (LRFs) and other water companies:** Feedback following the freeze and thaw event highlighted the benefits of good collaboration with a broad range of stakeholders before, during and after events and incidents. We have placed a particular focus on improving collaboration with LRFs and other water companies.

    - ***Local resilience forums:*** Our internal review of the freeze and thaw event highlighted inconsistencies in the extent and effectiveness of our engagement with LRFs across parts of

our region. In some cases we engaged early and often, with both parties benefitting considerably from the two-way sharing of information. In other cases we were much slower to engage them and failed to realise the potential benefits. As a result and with their help we have developed simple guidelines for when and how to engage with LRFs and other local partners. We have listened to best practice from other companies on this issue and plan many more proactive sessions with LRFs through the year. Details of our work to improve our incident plans with LRFs are included in Section 3.2.

Decisions already taken following initial LRF meetings:

- Trialling sharing our District Metered Area (DMA) information with Derbyshire LRF, to make it easier to communicate the areas that are affected or may be at risk during an incident.
- Providing more regular situation reports to LRFs during live incidents to keep them better informed of developments.
- Maintaining a dedicated LRF work-stream during incidents to ensure LRFs have a consistent and reliable point of contact for escalation, updates and information.

- ***Other water companies:*** Following the freeze and thaw event we recognised that we could have done more to collaborate with other water companies. By not doing so, we missed opportunities to share intelligence, best practice and resources. An example of how we have reflected this in our response to the recent hot weather is a radio campaign promoting water conservation that we jointly funded alongside a number of other water companies. We have also had a number of best practice sharing conversations with other water companies; and are working through Water UK to understand where best practice exists across the industry. As a result we have built a number of other companies' best practices into our plans. We also continue to play an active role in Water UK-led discussions on industry-wide challenges including mutual aid, bulk supplies and supply pipe ownership, where joined-up thinking and consistent approaches are particularly important.

- **Communicating with a consistent voice:** CCWater's research highlighted that customers value hearing a consistent voice from water companies during incidents. Their preference is for a single spokesperson to act as the voice of a company for the duration of an incident. It has been our policy to have a designated spokesperson for an incident for some time (including during the freeze and thaw event, when our Chief Financial Officer was the designated spokesperson), although of course it isn't always logistically feasible for one person to handle all media engagements – especially when incidents run for a prolonged period.

3.5. Vulnerable customers

Our key learning from the freeze and thaw event was that we did a good job supporting the vulnerable customers we knew about – but the CCWater survey showed us that there were many who considered themselves to be vulnerable that we didn't know about. Additionally, our recent customer research highlighted giving additional help to our most vulnerable customers as one of the most important elements of this action plan. We are therefore focusing on improving our identification of vulnerable customers, in particular those experiencing transient vulnerability. Specific things we are doing include:

- **Implementing a wider Priority Service Register (PSR) to better handle customers with transient vulnerability needs:** In recognition of the high number of customers experiencing transient vulnerability needs during the freeze and thaw event, we are implementing changes

to our PSR that will allow us to accurately record *all* customers who have contacted us and classified themselves as vulnerable. Two new categories have been created for customers with temporary/transient vulnerabilities: 'temporary – post hospital recovery' and 'temporary – life change'. We will review the circumstances of customers experiencing transient vulnerability every three months (although alternative timescales can be agreed with customers where more appropriate) to check if they still need to be on the PSR.

- **Making it easier to identify customers who have transient vulnerability needs during events:** We will make available additional channels for customers to identify themselves as vulnerable, including a priority phone number and an online registration. Customers who identify themselves through these channels will be flagged for priority service support. We will promote these additional channels via our website, social media, local resilience forums and recorded messages for inbound calls.

- **Establishing procedures to share data on vulnerable customers with energy companies**: We have been working with other companies in the sector and in the energy industry as part of the Water UK-led '2020 Data Share' initiative to share PSR data. The aim of the initiative is to develop a legally robust process whereby PSR data is shared across companies to enrich each individual participant's PSR. The initiative is expected to go live in April 2020 and we have already trialled sharing 5,000 customers' data with Western Power Distribution. Our participation in 2020 Data Share will help to ensure that our PSR is complete and accurate.

3.6. Compensation

Following the freeze and thaw event we reviewed two specific aspects of our approach to compensating customers: (1) setting appropriate compensation levels; and (2) effectively communicating to our customers that compensation is available.

- **Setting compensation levels:** Directly following the freeze and thaw event we took a decision to compensate affected customers above the levels set out in our Code of Practice. We subsequently elected to make these our standard compensation levels for future incidents, and have updated our Code of Practice accordingly. In addition, we are also actively participating in the current Ofwat consultation on compensation levels.

- **Communicating availability of compensation:** Following the freeze and thaw event we directly compensated all potentially qualifying customers located in areas that were affected by the event (even though our Pipe Up customer survey suggested that a reasonable number of these customers had not actually been directly affected). We only communicated that compensation was available to the customers we had identified as being eligible. Subsequent customer research and stakeholder engagement has identified an expectation that the availability of compensation should be communicated more broadly, to give all our customers greater opportunities to proactively identify themselves as being eligible. We have updated our approach for future events accordingly.

4. Recover

4.1. Overview

We recognise that responding to a major incident of any type can impact normal customer services – and an incident isn't fully over until business as usual service levels have been restored for all our customers. Having robust incident recovery plans is therefore essential. Following the freeze and thaw event, we have strengthened our incident recovery plans in two key areas:

- Minimising and managing backlogs of routine network maintenance and customer service activities that may build up during incidents.
- Engaging with customers and stakeholders following incidents to ensure their experiences and feedback inform our ongoing efforts to improve our operational resilience.

4.2. Minimising and managing backlogs

We are already rolling out our plans to minimise and manage backlogs of routine network maintenance and customer service activities by creating additional capacity, using 'virtual Distribution Service Technicians (DSTs)' and managing performance:

- **Creating additional capacity:** We have upskilled 80 non-operational Severn Trent and contract resources to act as tankering operatives during incidents. This reduces the need to redeploy DSTs onto tankering activities, who are therefore able to continue with their business as usual activities. The ability to maintain this focus on business as usual helps to avoid backlogs building up during incidents.

- **Using virtual DSTs:** We are trialling the use of smartphone video-telephony to create centrally-based 'virtual DSTs' that will be able to advise on jobs and liaise with customers remotely. Elements of the trial include:

    - Using non-skilled resource to attend jobs, with remote technical support provided via smartphone video-telephony from a centrally-based virtual DST. We think this will enable non-skilled resources to complete up to 15 jobs per day, compared with 4-6 jobs without the virtual DST support.
    - Using smartphone video-telephony to enable DSTs to liaise with customers on technical issues without having to visit them in person. While in some cases calls will still result in a DST visit, in other cases issues will be successfully resolved remotely, thereby eliminating the need for a visit.

- **Managing performance:** We have introduced a specific reporting regime to track recovery performance which includes a tracking document to track initiatives and prioritised work types back to business as usual levels; and daily conference calls to ensure resource is allocated accordingly.

4.3. Engaging with customers and stakeholders

We know how important it is to engage with our customers and stakeholders following incidents. We broadly did this well following the freeze and thaw event, but have nevertheless taken the opportunity to review our approach, which has three main elements:

- **Reaching out:** It is important that we proactively reach out to our customers following events and incidents to explain what happened and why; to set out what we're doing about it; and to

invite them to tell us about their experiences. We use a range of channels including our website, social media, letters, emails and door-to-door visits. Our key learning from the freeze and thaw event is that too much information is better than too little.

- **Listening:** Following the freeze and thaw event we focused hard on listening to our customers' experiences and inviting their feedback. We ran bespoke feedback surveys through our Pipe Up system; met customers including householders, farmers, businesses, hospitals, prisons and schools; and spoke with local stakeholders including Local Resilience Forums, Councils and MPs. Their views have fed directly into the plans set out in this document.
- **Giving back:** We always look for opportunities to give something back to communities affected by incidents. Our preference is to work with local community groups and MPs to identify the best and most appropriate ways to do so. Examples of actions taken following the freeze and thaw event include sponsoring community family days, donating to a local charity's fund for a wheelchair-accessible vehicle for vulnerable customers and delivering educational visits to schools.

5. Governance and Assurance

5.1. Independent assurance, Board support and approval

Jacobs have independently reviewed the approach we have taken, our interpretation and compliance against regulatory guidance, our key assumptions and approach to investment choices and the consistency with evidence/inputs and levels of evidence supporting the narrative of this report.

Summary of Jacobs' key findings (taken from their summary assurance letter)

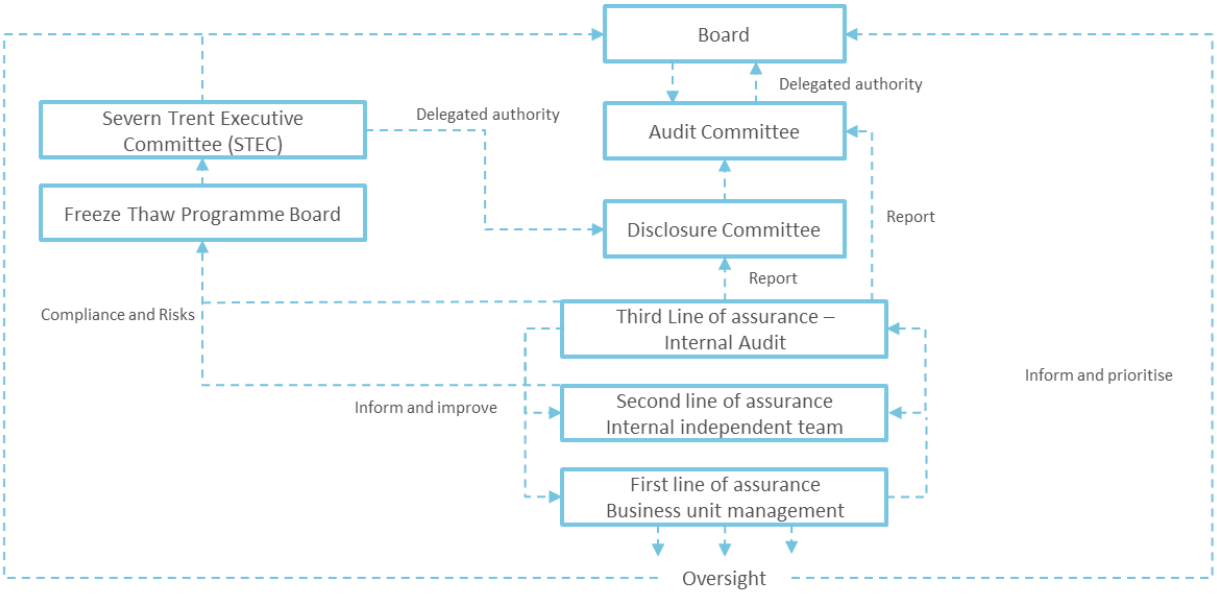
"Informed by the evidence we have been shown and described, it is our view that the STWL action plan addresses the observations made in Out in the Cold, Ofwat's letter to STWL about its response to the freeze thaw event and the commitments made in STWL's initial response to Ofwat (dated 10 May 2018). We have seen evidence that STWL has sought feedback from its customers and stakeholders and that is has taken significant steps to be ready to better serve its customers the next time there is bad weather; we have heard examples of where learnings from the freeze thaw event have already been applied during the hot weather this summer. Furthermore, we are confident that action owners understand and can explain the ways in which they are delivering on, or planning to deliver on, their actions. We can see that good progress has be made and our assurance observations support the conclusion that the action plan addresses Ofwat's concerns; it is deliverable and will support operational resilience generally."

This report has been reviewed by the Board of Severn Trent and has its support. The Board considers that it is a solid and deliverable high-quality plan underpinned by thorough independent assurance. Liv Garfield (CEO) and Andrew Duff (Chairman) have been authorised by Board members to submit this report to Ofwat on their behalf.

5.2. Audit Committee review of assurance and oversight of implementation

The independent assurance of this report by Jacobs has been supervised by the Chairman of the Severn Trent Audit Committee.

Building on our already established assurance framework (summarised below) and to ensure that all aspects of the plan set out in this response have been fully and satisfactorily completed, the proposed actions set out but not completed at the date of this report will be monitored by a programme board and will also be tracked and reviewed by the Severn Trent Internal Audit function which will report on its findings to the Severn Trent Executive Committee on a monthly basis.



In addition the Severn Trent Audit Committee will continue to review progress of the implementation of the plan against agreed actions and timescales on a six-monthly basis.

5.3. Oversight of future operational weather preparations and resilience

As can be seen from the above diagram the Executive Committee of Severn Trent Water, led by the CEO, has key accountability for the oversight of improvements to the Company's state of preparedness for and response to seasonal weather changes. In addition there has always been a high degree of oversight by and communication between the Executive Committee and the Severn Trent Water and Severn Trent Plc Boards. During the freeze and thaw event, in addition to daily email updates to both Boards from the Production Director and Chief Customer Officer, the CEO provided formal monthly updates on 23rd March, 20th April, 18th May, 14th June and 17th July.

To give a flavour of the degree of its involvement, immediately following the freeze and thaw event and well ahead of the recent hot weather the Executive received twice-daily email updates from the Production Director and Chief Customer Officer and met weekly to receive and discuss detailed reports on forward-planning activities. This was transmitted onwards to the Severn Trent Water and Plc Boards through regular report from the CEO.

The Executive Committee receives immediate text messages on every single operational incident which ensure that it is fully aware of all incidents (big or small) so that it can ensure that the appropriate response is being taken. The Executive Committee also receives weekly formal reports detailing operational preparations taking account of the network planning meetings detailed in Section 3.2. The Executive Committee and the Board additionally formally forward-review cold weather preparations in November and hot weather preparations in March of each year.

6. Conclusions

By implementing the actions set out in this document we are confident that we will reduce the likelihood of future weather-related events becoming incidents; and be better prepared for and equipped to deal with those that do. We have been encouraged by the positive impact of the actions we have already implemented on our management of the recent extended period of hot weather. We now need to implement the remaining actions and ensure that they become fully embedded in our organisation and ways of working. In doing so, we will provide our customers and stakeholders with full confidence in our operational resilience.