

**Dŵr Cymru Cyfyngedig (Welsh Water)'s response to  
2022 December Freeze Thaw Event**

## Contents

1	Executive Summary.....	4
2	Planning.....	7
2.1	DCWW Winter Preparedness.....	7
2.1.1	Winter Plans.....	7
2.1.2	Winter Preparedness Exercise .....	8
2.2	Customer Winter Campaigns.....	9
2.3	Weather monitoring .....	10
2.4	Preparation leading into the week of the freeze thaw.....	10
3	Incident Response.....	12
3.1	Command structure .....	12
3.2	Timeline of the operational impact .....	13
3.3	Leakage Detection and Repair .....	16
3.4	Alternative Water .....	18
3.4.1	Management of Alternative Supplies .....	18
3.4.2	Alternative Water Stations – West Wales and Herefordshire .....	19
3.4.3	Alternative Water Stations – Trellech Response .....	21
3.4.4	Alternative Water Planning Thresholds against Actual Response .....	21
3.5	Vulnerable Customers & Sites .....	22
3.6	Regulatory Engagement.....	23
3.7	Stakeholder Engagement.....	24
3.8	Customer Communication and Contact Handling .....	24
3.9	Media Relations .....	26
3.10	Customer Minutes Lost (CML) .....	26
4	Customer compensation.....	28
4.1	Household customer compensation.....	28
4.2	Business Customer compensation.....	28
5	Lessons Learnt and Post incident Review .....	29
5.1	Lessons Learnt from Previous Freeze / Thaw events.....	29
5.1.1	OFWATs Out in the Cold Report 2018 .....	29
5.1.2	The DWI’s report ‘Consolidated review of the widespread loss of supplies arising from the freeze/thaw affecting England and Wales in March 2018’ dated 19 June 2018.....	30
5.1.3	National Incident Management (NIM) Group.....	31
5.2	DCWW Internal Post Incident Review (PIR).....	31
5.3	LRF Debrief Sessions .....	32

5.3.1	Dyfed Powys LRF .....	32
5.3.2	Herefordshire Council and Monmouthshire Council .....	32
5.4	Post Incident Review Recommendations .....	33
5.4.1	Recommendations .....	33
5.4.2	Specific Actions .....	34
5.5	Independent Review .....	34
5.6	Independent Challenge Group Review .....	35
5.7	Key Learning - Modelling Approach .....	36
5.8	Comparison with Previous Severe Winter Weather Events .....	38
6	Appendices.....	39
6.1	Appendix 1: Exercise Winterfell Report .....	39
6.2	Appendix 2: Operational Weekend Planning Meeting .....	49
6.3	Appendix 3: Letter to Julie James MS .....	53
6.4	Appendix 4: Freeze Thaw Customer Letter.....	55
6.5	Appendix 5: Household Customer Compensation Letter .....	58
6.6	Appendix 6: Freeze Thaw Post Incident Review (PIR) Report.....	59
6.7	Appendix 7: Independent Challenge Group (ICG) Initial.....	69

## 1 Executive Summary

First of all, we would like to apologise to our customers who lost supply during December 2022 as a result of the freeze – thaw event. Whilst we maintained supply to over 99% of our customers during this period, we are sorry that a number of rural communities in some instances experienced prolonged loss of supply. There are some clear lessons for us to learn from our response and we will expend every effort to implement respective opportunities to improve our performance in similar circumstances in future.

The period between the 11<sup>th</sup> and 17<sup>th</sup> of December saw sub-zero prolonged freezing conditions followed by a rapid thaw in temperatures. Extreme weather is now more common within the UK, with the Beast from the East in 2018 still in recent corporate memory, however, the Met Office have described this event as one of the most ‘significant spells of low winter temperatures since the exceptional December of 2010’. They also correlated the temperatures in Wales (and parts of Hereford) at this time, with those in the Highlands of Scotland (see Fig 1). Most notable was the rapid rate of change between the last cold day of the spell, and the first thaw day, which saw an increase in the average daily temperature of 6.7°C, the greatest rate of change for all events back to and including 1947.

The impact of the freezing phase of the incident was seen right across the company, but our West Wales operating area saw the largest impact of frozen pipes and burst mains. These were generally managed with little customer impact and were in line with the normal effects of a cold weather period. In preparation for the change in weather, Silver Command Centres were mobilised on the 12<sup>th</sup> December to co-ordinate activities between our leakage, repair and maintenance, and call centre teams at a regional level, with Gold Command co-ordinating the company level response with daily Situation Reports produced. This followed a full review of our Winter Plans which took place in November and exercising of these on the 22<sup>nd</sup> November through Exercise Winterfell, with the learnings briefed to our Crisis Management Team, chaired by the CEO on the 30<sup>th</sup> November. This is a well established annual process. The Glas Cymru Board was informed of the exercise via the CEO report at the December Board. The Board also received daily updates on the response to the ‘freeze thaw’ from the CEO during the incident.

Following the weather forecast that the start of a thaw was widely reported to be on Sunday 18<sup>th</sup> December, appropriate resourcing was mobilised to deal with an expected increase in activity levels, as we are accustomed to in these events. However, overnight on the 16<sup>th</sup> December, our West Wales operating area experienced a rapid thaw moving through to Mid Wales and Herefordshire on the 18<sup>th</sup> December.

Distribution Input (water into supply) across the Company saw a large increase over this weekend but in West, Mid Wales and Hereford the demand for water matched the peaks of the heat waves through the summer of 2022 drought. Despite all treatment works operating as normal and service reservoirs being maintained at optimal levels, storage across the networks rapidly depleted, with 10 service reservoirs running empty in quick succession with demand outstripping supply. We had teams finding and fixing leaks and responding to distribution issues, however in these largely rural areas there is a considerable amount of above ground consumer pipework e.g., cattle troughs and farm outbuildings and we estimate up to 60% of the water lost during this period was linked to leaks on customer pipelines.

Our company level customer engagement plan to heighten the awareness of ‘freeze – thaw’ risk started on 5<sup>th</sup> December and we delivered this through TV, radio and social media. During the incident we were in regular dialogue with stakeholders, including Sennedd Members, MPs and Councillors in the affected areas. Our CEO provided daily updates to David Black and Gwenllian Roberts, respectively CEO and Wales Director at Ofwat. Our CEO also wrote personally to Julie James, MS, Climate Change Minister on 23<sup>rd</sup> December to appraise her of the incident and our response (Appendix 3). Between 15<sup>th</sup> December and 1<sup>st</sup> January we sent over 180k text messages to customers who suffered supply interruption during this period, keeping them updated on the latest resolution information and locations for alternative water provision.

Our full fleet of over 40 water tankers were initially deployed to the six reservoirs that lost storage in West Wales, however this was not sufficient to restore supplies to the approximately 12,000 properties supplied from these reservoirs. As a result, the distribution network depressurised and some customers lost supply for up to seven days, with the majority being restored within four days. The depressurisation led to significant operational challenges in restoring the supplies more promptly. The leaks, which were causing the loss of supply, were particularly difficult to locate given the lack of hydraulic pressure within the system. This was further compounded by issues with air locking across the rural networks, effecting both the distribution network, pumping stations and individual customer supplies. Aberaeron, Llandysul, Cardigan, Newcastle Emlyn, Llansteffan and Hafod were the main conurbations impacted with bottled water stations set up in these areas, along with bottled water deliveries to Priority Services customers.

In Mid Wales, as the tanker fleet was largely deployed in the West, we were limited in our ability to provide any support to improving storage and concentrated efforts instead on leakage find and fix. As storage slowly recovered in the West, we moved some of the tankering operation across to restore supplies in Hereford. With four SRVs running empty this impacted around 2,000 properties across the Dorstone, Welsh Newton and Llandrindod Wells areas, with all customers brought back on supply within 4 days, before Christmas Day. Bottled water stations were set up and deliveries made to priority services customers in these areas.

Not related to the freeze thaw, on the 22<sup>nd</sup> December we had a high pressure trunk main that supplies Trellech Service Reservoir near Monmouth fail. This was a 28 bar pipeline which required specialist fittings and concrete thrust restraints to be manufactured to undertake the repair safely, which took around 30 hours. With the majority of our tanker fleet deployed across West and Mid Wales as we recovered from the impact of the freeze thaw, we had limited tanker capacity to support Trellech and lost supply [in the Monmouth area] to around 1,300 properties for up to 5 days. Further bottled water stations were established and deliveries made along with the deployment of bowsers to farms in the areas. As we experienced in West Wales, air locking in this rural system created difficulties restoring supplies once storage was restored to the reservoir.

During this incident we exceeded our SEMD commitment for alternative water throughout Wales at all times, ensuring enough bottled water was available (or delivered where appropriate) to meet the SEMD thresholds. We also ensured that key vulnerable customers on our Priority Services Register received deliveries of bottled water during the incident.

Immediately following the event we started to identify all customers that were without water and began to process the appropriate Guaranteed Standards of Service (GSS) payments. At the time of writing, we have paid over 15,300 customers and the total value of these payments is over £2.5m. All our household customers have received an enhanced GSS payment amount and we have set up a process to deal with any requests for financial support from our non-household customers towards

any verifiable losses they incurred due to the event. Further details of our compensation process is included in section 4. The process for this was communicated before Christmas and all customers were contacted during January and early February and made aware of the payment they would receive. In calculating payments, where there was any uncertainty as to the length of time certain areas were out of supply, we ensured customers were paid for the longest potential outage.

We held a detailed full day post incident review in January covering the event led by our Water Services MD. This reviewed our holistic response to the event, identified the key workstreams for areas of improvement, and confirmed the external reviews that we would commission as part of our response. The detailed findings are contained within this report along with a clear action plan evidenced against all the identified learning. We have held a structure debrief with Dyfed Powys Local Resilience Forum and have also had informal de-briefing sessions with the emergency planning teams at Herefordshire and Monmouthshire County Councils.

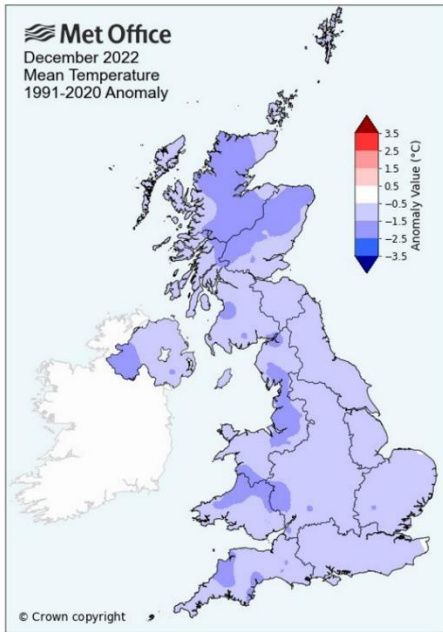
We have clearly learnt lessons from this winter event and fully recognise there are improvements to be made in similar circumstances in future. The primary issues where we will seek to improve are;

- Customer Communication During the Incident – our ‘In your Area’ interactive page on our web site aims to inform customers of matters affecting them in real time. There is scope for us to improve how quickly we post more accurate information during incidents.
- Deploying Alternative Water Supplies In Rural Areas – the deployment of alternative supplies in sparsely populated areas is an operational activity we will look to improve.
- Strategic Treated Water Storage – we intend to undertake a review of strategic (service reservoir) water storage in the worst affected areas to improve resilience especially in Ceredigion and parts of Mid Wales. (This follows a similar approach applied in Pembrokeshire following Storm Emma in 2018). It will be our aim to make funding available to construct additional storage in the worst at risk areas over the next two years.

We have also commissioned two independent reviews of our response to the December 2022 ‘freeze – thaw’. The first is through our Independent Challenge Group, chaired by Peter Davies who has a long history and track record of consumer issues in Wales. (He was also the former Climate Commissioner for Wales). Peter’s initial findings are contained within this report and include insightful feedback regarding our preparation for the incident, our support for vulnerable customers and our approach to compensation, with some improvements identified on customer communication during the incident. Peter is undertaking a series of in-depth interviews with key community representatives from the affected area. A final report will be discussed with the ICG before submission to DCWW by the end of March. This report will then be made available on the ICG website.

The second of these reviews is being undertaken by Jacobs Engineering and will focus on our performance during the incident. Due to the extent of this review, it will report in stages with Phase one by 24<sup>th</sup> February and the full review completed by 31<sup>st</sup> March. This will be shared with Ofwat on completion. The key findings from phase one have been incorporated into this report.

Finally, we would take this opportunity to acknowledge and thank our colleagues involved in the response. All of whom worked around the clock in very challenging conditions to do their best for customers.



## Met Office December 2022 Mean Temperature Data

- The lowest mean temperatures seen in Wales / Hereford match those of the Scottish Highlands
- The parts of our operating area affected in this way - matches the communities most impacted by the freeze / thaw – Ceredigion, Mid Wales & Herefordshire

Figure 1: Met Office Mean Temperature Data

## 2 Planning

### 2.1 DCWW Winter Preparedness

#### 2.1.1 Winter Plans

Across the water business, each function reviews and updates their Winter Plans annually, which are then reviewed at the respective Managing Director meetings in advance of any winter impacts. Many of the actions within these plans are included as a result of external reports on sector wide incidents and /or learning from DCWW incidents / exercises (Table 1).

Table 1: Excerpt from the 2022 Winter Plans for the emergency function

	Area	Actions	RO	Date	Comments	Status
1	Health and Safety	<ul style="list-style-type: none"> <li>- Severe Weather briefing</li> <li>- Take 5</li> <li>- Winter conditions</li> <li>- PPE</li> <li>- Slips trips and falls</li> <li>- Winter Driving – do annually, see source for video</li> </ul>	Steve Youell	Ongoing	Will be covered at Team Meetings and Weekly Monday morning catch ups	
2	Resource Planning	<ul style="list-style-type: none"> <li>- Emergency Planning Rota in place for the Christmas and New Year period.</li> </ul>	Steve Youell	Complete		
3	Bottled Water	<ul style="list-style-type: none"> <li>- Contingency stock in place in South (Clydach) and North (Dinas) available for deployment</li> <li>- 44 pallets (holding stock) at BC</li> <li>- Contact in place with BC for further stock as requested (in line with SEMD requirements)</li> </ul>	Steve Youell	Complete	EP Team monitor and maintain stock levels	
4	Alternative Water Supplies	<ul style="list-style-type: none"> <li>- 150 1000l Arlington Tanks in North</li> <li>- 223 1000l Arlington Tanks in South</li> <li>- 150 1100 Aquastacks in South (require chlorination)</li> <li>- Single/low number (up to 10) deployment can be undertaken via 4x4 and trailers</li> <li>- Distribution would be required for widespread deployment</li> <li>- Tanker support will be required to fill and ensure re-fills</li> <li>- Rollers, barriers and signs available for bottled water</li> <li>- Curtainsiders in South and North available if required</li> </ul>	Steve Youell	Complete		

### 2.1.2 Winter Preparedness Exercise

Within our Annual Exercise Programme, we conduct a mandatory Winter Preparedness exercise. This is a full day involving all operational and support teams across the business. The objective is to validate functional winter plans against various scenarios. As part of the exercise planning, the scenario is agreed within our Crisis Management Team (CMT) chaired by our CEO, to provide Board level oversight and governance around the process.

Whilst previous years have focused on wet weather Storms, this year Exercise Winterfell focused on snow and ice, with a freeze thaw element factored in through a time jump. An overview of the scenario is outlined below:

*A storm system named STARK is moving across Wales bringing with it low temperatures, high winds, heavy snow, and widespread ice. As a result, Public Health Wales has issued Cold Weather Alerts and the Met Office has issued severe weather warnings (Yellow > Amber > Red) covering parts of Wales. These conditions are causing significant disruption to transport networks, power supplies, telecommunications, and water supplies. A significant number of Water/Waste assets are inaccessible and have lost power. Gold has stood up and is supported by Silver incident rooms (water and waste) which have opened across the operating area to manage local impacts.*

#### **+1 Day (the exercise jumps forward to 10am the next day – Nov 23rd)**

*A freeze thaw and sudden rise in temperature has caused significant pressure on the network. There is an increase in the number of mains bursts causing loss of water supplies in local communities.*

The exercise was completed on the 22<sup>nd</sup> November with a Hot Debrief conducted following the closure of the exercise. Lessons identified from the exercise included:

- The reinforcement of having loggists within Gold and Silver teams to ensure the timely capture of information and SitReps
- Exercise provided a safe environment for colleagues who are new to incident response / standby to gain incident experience
- Provide realistic social media posts to respond to following a freeze / thaw outbreak
- Identified further areas of the incident response process to be included in the formal Gold / Silver training programmes and annual refresher training

All actions were captured in our wider Incident Management Action Tracker which includes learning identified from all Post Incident Reviews (PIRs). This Tracker is then managed through the Incident Response Group which consists of representation across the business to ensure all Actions are completed against the agreed timescales.

A full exercise report including the lessons identified was produced, shared with all players and the respective Heads of Service. The report was also presented to CMT as part of the governance process.

The full Exercise Winterfell Report is provided in Appendix 1.



## 2.2 Customer Winter Campaigns

Starting on 5<sup>th</sup> December 2023, before the freeze / thaw event occurred, we had already enacted our winter customer campaign which encourages customers to make sure any exposed water pipes are protected from freezing. Campaign activity commenced at the beginning of December (examples in Fig. 2) and included:

### **5<sup>th</sup> December, running through to 18<sup>th</sup> December.**

Paid campaign launched across:

- TV (ITV Wales, S4C, Sky VoD (All4, ITV Hub, Sky VoD)
- Radio
- Social Media
- YouTube
- Digital Display

Other activity:

- Wales Online launch article
- Shared stakeholder toolkit with partner organisations
- Organic social media
- Influencer blog and Instagram reel with Cardiff Mummy Says
- Winter prep leaflets within community mailers

We also shared our campaign materials with all our colleagues through our internal communication channels.

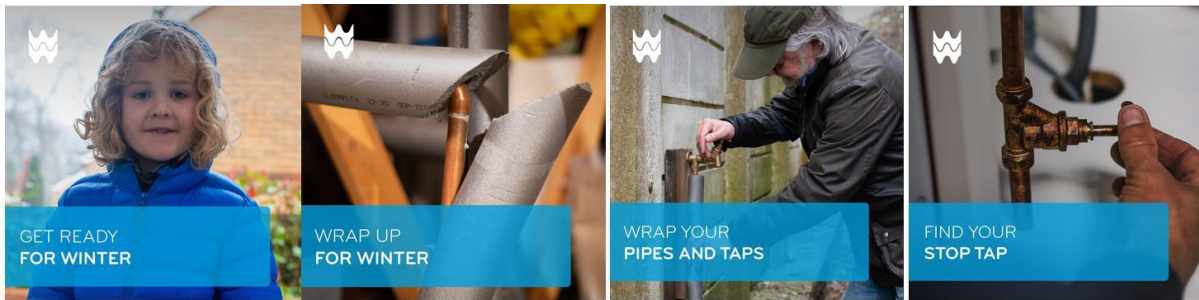


Figure 2: Example Winter Campaigns

Here also is link to the TV ad and cut downs on social:

[https://www.youtube.com/watch?v=98\\_FYtJwCpA](https://www.youtube.com/watch?v=98_FYtJwCpA)

### 2.3 Weather monitoring

Weather data is provided to DCWW as part of a contract with the Met Office. Details of the services that we receive include Daily Weather updates and Hazard Forecast which includes a General Synopsis, Radar and Nowcast Data in 1km and 5km, 5minute and 15 minutes resolution and a range of meteorological data for extraction, processing and visualisation as part of data projects.

Daily weather updates are distributed throughout DCWW via a distribution list for the attention of operational and support colleagues. Hazard forecasts and alerts are similarly distributed. The purpose of the Hazard Forecasts are to warn the public and emergency responders of severe or hazardous weather which has the potential to cause danger to life or widespread disruption. The Hazard Forecast includes detailed Day 1-5 forecasts and Outlook Summary Day for 6-15 complete with Risk Thresholds and warnings ranging from No Severe Weather, Be Aware, Be Prepared to Take Action.

DCWW also has a subscription to VisualEyes™ web-based onshore weather monitoring and alert system. The web-based application is set-up on screen within our Control Room or Smart Hub and used in Gold and Silver incident rooms with the capability of showing a broad range of animated weather layers and a long range view out to 14 days in the probabilistic weather charts.

Colleagues are also encouraged to download the Met Office app to provide an up-to-date forecast for local areas, and instructions to configure National Severe Weather Warning notifications direct to mobile devices.

DCWW also receives 5 minute, 1km resolution Radar data which links into the telemetry system Prism, 15 minute, 5km resolution Nowcast used in site specific real-time hydraulic models and a variety of weather parameter data including Hourly Wind Speed (m/s), Hourly Temp (DegC), Sunshine Amount (s), Hourly Precipitation (mm), Prior days t+0 values for data model development.

This range of weather information was monitored closely during December and was a key part of our preparation for this incident, as outlined later within this report.

### 2.4 Preparation leading into the week of the freeze thaw

Planning for the expected cold weather started on Friday 9th December 2022 with a preparation call led by a Head of Service, with all Senior managers within the distribution function. The call covered the incoming weather risks and the need to start building enhanced resource lists for the following week, based on the predictions of increased distribution input, as a result of the change in weather forecast.

Daily Head of Service led Gold calls were in place from 12th December 2022 to review resource availability, storage positions, review critical work and jeopardy management of other business as usual tasks, in addition to weather forecasts. The output of these Gold calls was shared with the CMT team on Monday, Wednesday and Friday of that week. On Wednesday 14th December a meeting was held with all operational Silver managers to plan for the weekend of 16th-18th December, to reinforce principles, escalation, and reporting lines for the weekend (see Appendix 2).

We formally opened our three Silver Centres (South West Wales, North Wales & South East Wales) on Monday the 12<sup>th</sup> December and they were fully manned for the weekend from 8am Saturday 17<sup>th</sup> morning based on the weather predictions. Full resource availability was in place which included additional people on standby rotas for all key skillsets, and increased availability from our third-party support, the Water Network Alliance (network repair) and Leakage Detection contractors.

Within Emergency Planning, given the potential impacts of obtaining bottled water during Christmas week and the expected level of response, extra bottled water provisions were delivered to our Clydach depot during the week leading up to the 17 December. We ensured this additional volume would cover our 24-hour delivery requirements under SEMD.

We also communicated to our Bottled Water suppliers that additional stocks may be required over the weekend and throughout the following week to ensure we had availability of stock. We also implemented an enhanced standby rota over the weekend and into the following week for our emergency planning professionals.

Ahead of the weekend we put a request out to our Incident Support team (Volunteers) to support operations over the Sunday and Monday with bottled water deliveries or tankering, based on the weather forecast and the potential impact from a freeze / thaw (Fig. 3).

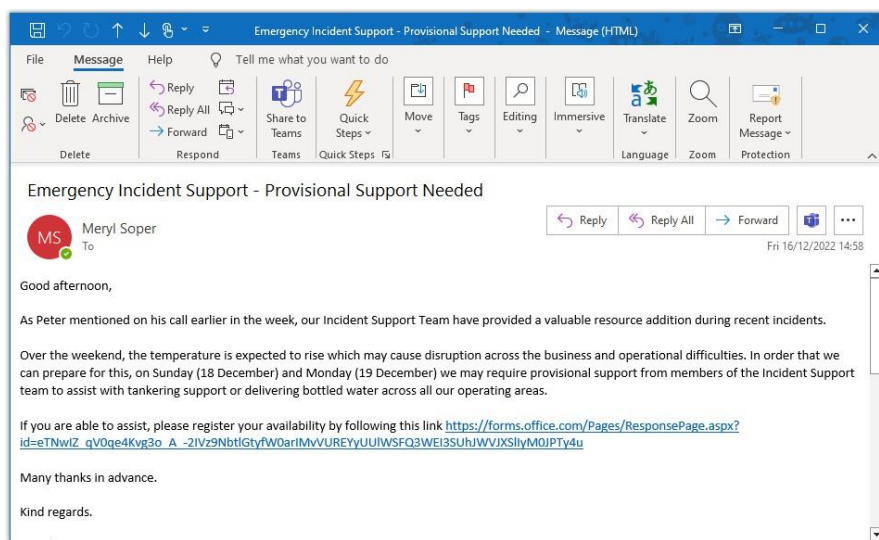


Figure 3: Incident Support Request

In preparation for the weather event the company made the decision to proactively contact our priority services customers with an immediate need for water (P1) ahead of any potential issues being encountered. Of the 5,729 customers on the Priority Services Register with immediate water needs, we identified 2,579 P1 customers with a mobile telephone number (we have a project which will increase this this number proportion rate) and arranged proactive texts. We sent the mass texts at intervals through 15th December, and again on the 17th of December, 5,158 texts across both days.

In addition, 1,419 emails were sent on Friday the 16<sup>th</sup> to customers where we did not hold a mobile contact number. An example of the communication provided is contained below:

Dear Occupier, your household is currently registered with us for free priority services. We are currently experiencing freezing temperatures and frozen pipes which could lead to a loss of water. We are urging all our priority customers to stay safe and stock water, if possible, to ensure you have water available. For more information on how to Get Winter Ready please visit: <https://www.dwrcymru.com>

We did not include any offer of alternative water at this point, as these messages were prior to any impact. This was all planned for inclusion specifically post impact, once any areas were identified, and factored into the additional supplies we purchased during this week.

## 3 Incident Response

### 3.1 Command structure

In accordance with the incident triggers outlined within our Incident Response Manual (IRM) a Gold Incident was declared on the 12<sup>th</sup> December. Our Gold Command structure was mobilised which included the following key incident roles:

- Gold Manger
- Loggist
- Silver Manager
- Communications Lead

A number of roles / teams were working within the Silver (tactical) response level including:

- Retail – responsible for customer call handling, management and updating the website and responding to social media messages.
- Communications – responsible for wider stakeholder engagement, conducting press interviews and agreeing media, social and website messaging.
- Emergency Planning – responsible for managing the provision of alternative supplies, liaising with Local Resilience Forums (LRFs) and providing information to the National Incident Management (NIM) Group for overall sector profiling
- Water Logistics – responsible for managing the deployment of the tanker fleet to either supporting SRVs levels or direct injection into the distribution network.
- Water Distribution – responsible for maintaining the response on the ground, management of operational resources, on site customer interactions, hydraulic modelling and PSR customer management
- Water Engineering – responsible for leak detection and repair
- Water Quality – responsible for customer and operational sampling, maintaining the DWI liaison and providing input to customer messages with regard water quality

A battle rhythm was established in terms of Gold calls which was sustained through the incident response. Our Gold Command also reported into CMT on a daily basis.

As the incident progressed and we started to establish a level of confidence in some geographical locations (e.g. North Wales), the incident teams in these areas were stood down to either provide an opportunity to save resources or provide resource support to other operational teams. From the Tuesday 20<sup>th</sup> December, the focus of our efforts and response was very much in our Western and

Eastern regions. From the 23<sup>rd</sup> December, whilst we maintained a response in West Wales, the focus was specifically on Monmouthshire as we responded to the burst main at our Trellech SRV.

Our Gold Command was maintained until the 30<sup>th</sup> December, when it was formally stood down.

### 3.2 Timeline of the operational impact

The DCWW operational area experienced a prolonged period of low temperature accompanied by some snowfall from 6-17 December as an Arctic Maritime airmass brought hard frosts with daytime temperatures struggling to rise above freezing in many areas. Daily minimum temperatures were amongst the coldest in the UK with many areas between -5°C and -10°C for several consecutive nights. This resulted in widespread frozen ground even in some coastal areas (- 9.4°C at Pembrey Sands in Carmarthenshire).

Following the Beast from the East in 2018, this was one of the most significant spells of low winter temperatures to affect the UK since the exceptional weather in December 2010. Met Office temperature data for December (Fig. 4) indicated that there was a dramatic change in conditions on 17<sup>th</sup> December with the cold airmass being pushed eastwards bringing behind it much milder air from the South West resulting in a rapid thaw.

The temperature swings were particularly significant in the Ceredigion area, with 11 days of below zero minimum temperature, which reached -10°C at their lowest point on the 15<sup>th</sup> December, followed by a maximum day time temperature of 14°C on the 19<sup>th</sup> December. Minimum daily temperature in Ceredigion as a daily trend throughout December are presented in Figure 4.

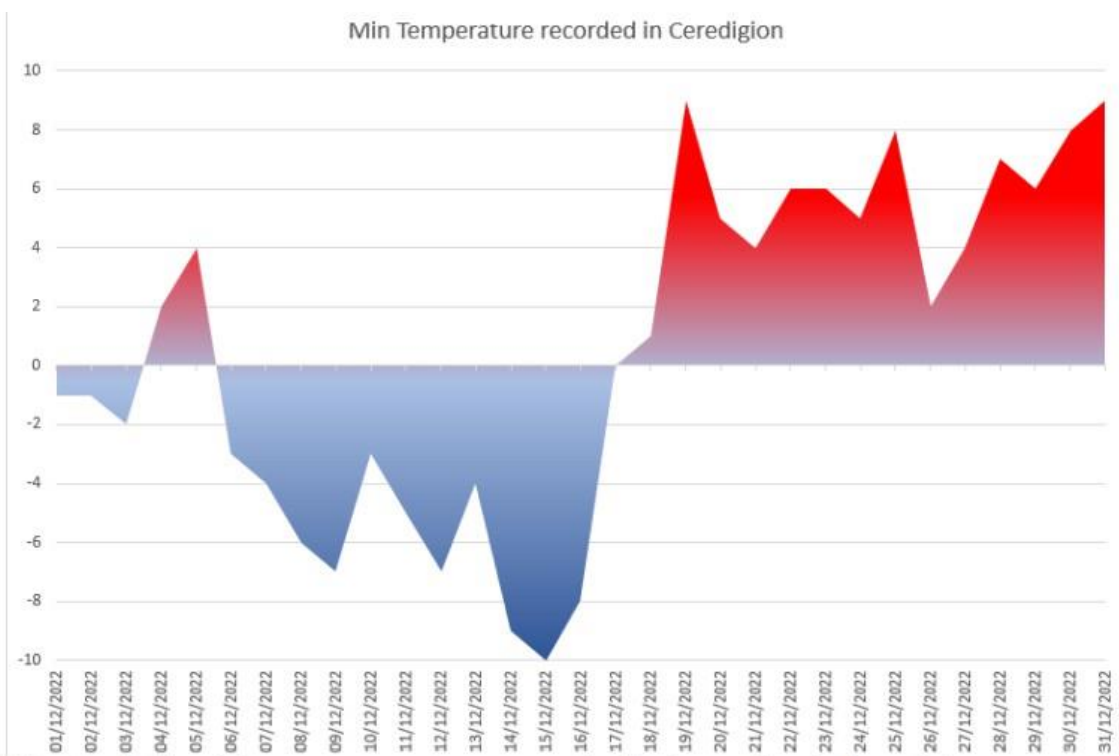


Figure 4: Minimum Daily Temperatures in Ceredigion

The cold weather initiated a breakout in leakage from 12<sup>th</sup> December which was exacerbated by the rapid thaw on 17<sup>th</sup> December, at which point the number of new leaks occurring peaked. The elevated quantity of leak occurrence continued until 20<sup>th</sup> December. At company level, this resulted in a 16% or 133 MI/d increase, in distribution input in the week from 13<sup>th</sup> to 20<sup>th</sup> December (Fig. 5), which was particularly prevalent in Mid-South Ceredigion, Carmarthen, Swansea, Hereford and Mid Wales.

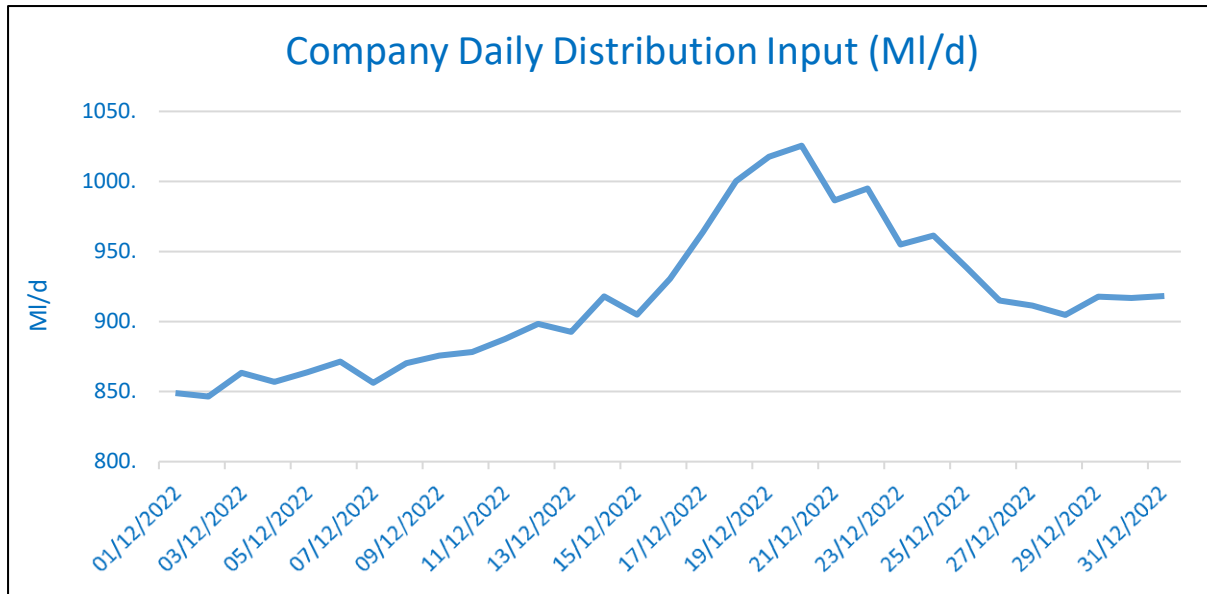
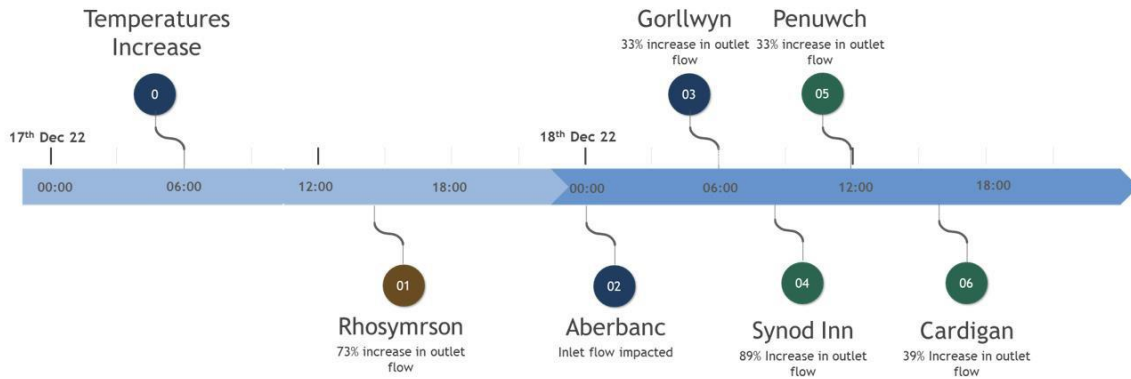


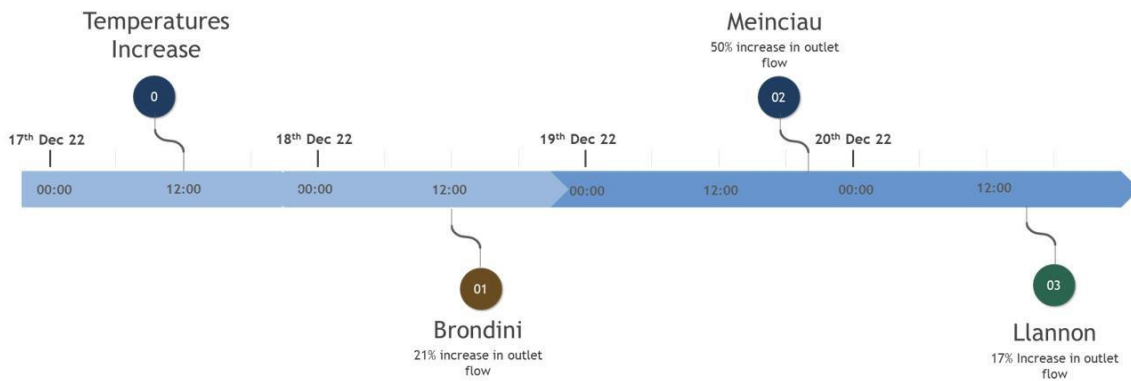
Figure 5: Company Daily Distribution Input

The increased demand for water on the network and the rate at which leaks were breaking out resulted in the depletion of water storage at service reservoirs in the West, Swansea and Eastern operational areas. In addition, the increased flow rates resulted in a deterioration in network operating pressures due to enhanced hydraulic losses, which meant supplies to service reservoirs and customers in the distribution system were impacted. Figure 6 provides an illustrative timeline of when the storage at the particular service reservoirs were depleted. In addition, the increase in outlet flow is noted as a comparison of the periods immediately before and after the thaw.

## Impact of Freeze/Thaw on Service Reservoir Storage Mid-South Ceredigion



## Impact of Freeze/Thaw on Service Reservoir Storage Swansea



## Impact of Freeze/Thaw on Service Reservoir Storage Eastern

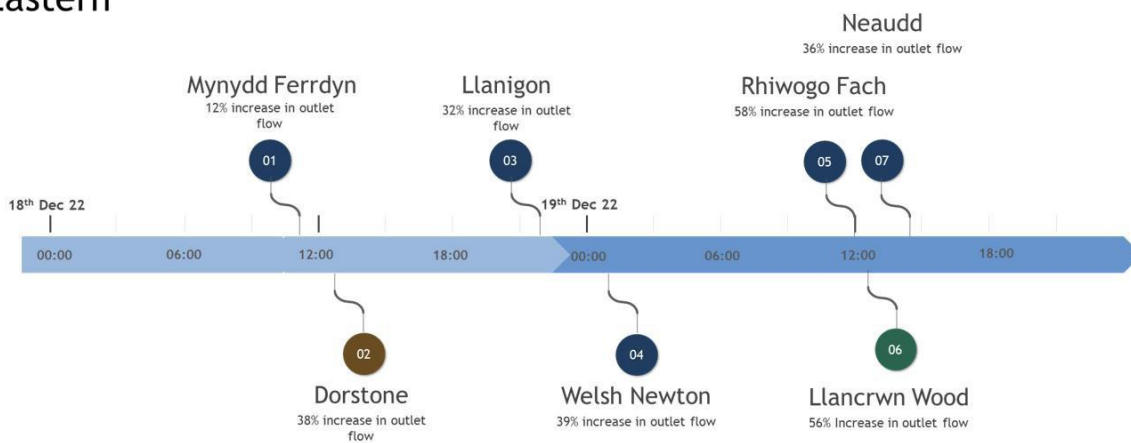


Figure 6: Service Reservoir Depletion Timeline

Through tankering activity, followed by leakage detection and repair, service reservoirs impacted by the freeze thaw were restored to an operational capacity across the West and East Wales between Sunday 18th December and Thursday the 22<sup>nd</sup> of December. A breakdown of dates for the restoration of key SRVs is presented in Table 2:

Table 2: Key SRV Restoration Timeline

West Wales			East Wales		
SRV Name	Date Fully Operational	Approximate Time	SRV Name	Date Fully Operational	Approximate Time
Penuwch	18/12/2022	13:00	Llancrwn Wood	20/12/2022	14:15
Nimpwll	19/12/2022	20:30	Mynydd Ferddyn	02/01/2023	01:00
Gorllwyn SRV	20/12/2022	11:30	Neuadd	19/12/2022	15:00
Rhosymerson	20/12/2022	06:00	Welsh Newton	21/12/2022	14:00
Synodd Inn	20/12/2022	09:00	Dorstone	21/12/2022	13:00
Caridgan	22/12/2022	21:15	Rhiw ogof fach	19/12/2022	23:30
Brondini	18/12/2022	22:30			
Meinciau	22/12/2022	01:15			

On the afternoon of 22<sup>nd</sup> December, a high-pressure trunk main burst occurred on the 250mm ain from Mitchel Troy Water Pumping Station (WPS) to Trellech Service Reservoir (SRV). As a result, the storage in Trellech SRV was depleted and the downstream network depressurised, resulting in loss of supplies to around 1,300 properties in the Trellech, Llandogo and surrounding areas of rural Monmouthshire.

The burst was on a 28 bar pipeline which required specialist fittings and concrete thrust restraints to be manufactured to undertake the repair safely. The main was repaired and recharged in the early hours of the 24<sup>th</sup> December. However, as we experienced in West Wales, air locking in this rural system created difficulties restoring supplies once storage was restored to the reservoir. Whilst we were able to use an element of our tanker fleet to maintain supplies, due to the rural network we were not able to maintain supplies to all customers and so we established a bottled water station whilst the air locks were removed. This response was maintained until the 30<sup>th</sup> December when all supplies were restored.

### 3.3 Leakage Detection and Repair

The increase in distribution input outlined in Section 3.1 was closely aligned with the increase in minimum night flows – a good indicator of leakage (Fig. 7). However, a large proportion of the increase in leakage reduced within the three days immediately following the thaw. This reduction cannot be wholly attributed to leakage repairs that were undertaken on the distribution network and will have been as a result of customer repairs. We estimate up to 60% of the water lost during this period was linked to leaks on consumer pipelines. In these largely rural areas, there is a considerable amount of above ground consumer pipework e.g., cattle troughs and farm outbuildings.





Figure 7: Minimum Night Flow for Eastern and South West Operational Areas

A crucial part of our operational response to the incident was leakage detection and repairs. Resources were managed through our Gold Incident team and prioritised to the impacted areas of current and emerging loss of customer supply. We experienced a 300% increase in the number of mains bursts repaired in the period 11th December 2022 to 4th January 2023 compared to the previous year, that being 660 against 217, of which approximately 97% were on smaller diameter pipes (<200mm), highlighting the complexity of the ability to pin-point and the basket of works involved. There were approximately 650 colleagues involved in the planning, detection and safe repair of over 2,100 leaks during that period, compared to 1,400 in the previous year. The response to the incident and elevated levels of leak detection has continued into February 2023, at the time of issuing this report.

### 3.4 Alternative Water

Our Alternative Water plan outlines the main considerations underlying determining the method and type of alternative water supplies being:

1. Duration of incident
2. Number of properties/customers affected
3. Resources required (people and equipment) based on the factors one & two
4. The convenience of any AWS being provided (bulk bottled water supply point vs street deployment)
5. Ability to notify customers of AWS provisions being made (locations of stations)

In addition, the Alternative Water Manager role (assigned as part of the plan) outlines initial actions, ongoing actions, and recovery actions with regard to the management of alternative water.

#### 3.4.1 Management of Alternative Supplies

The management of our alternative water supplies during the incident was undertaken by our Emergency Planning team.

In accordance with our Incident Response Manual (IRM) and Alternative Water Plan we appointed an Alternative Water Manger to coordinate the response which reported into our Gold Command structure. The Alternative Water Manager formed a response team consisting of the following internal teams:

- Water Logistics – responsible for curtainsider deliveries to sites, attending bottled water supplies to pick up bottled water stocks directly, moffet (forklift) operations at sites and in depots, tanker preparation and managing driver resource / shift patterns.
- Emergency Planning – responsible for liaising with bottled water suppliers to obtain further bottled water stocks, management of Arlington Tanks and attending Tactical Coordination Group (TCG) calls.
- Capital Delivery – responsible for utilisation and management of Hi Ab resource for delivering alternative water to alternative water stations, managing restocks and individual pallet drops.
- Incident Support (Volunteers) – responsible for supporting at bottled water stations during the incident, providing restock information to the wider team and monitoring customer footfall at alternative water stations.
- Communications – responsible for managing the messages for our alternative water.
- Retail – responsible for communicating via social media / website any updates on the alternative water stations, restocks and opening and closing periods.
- Distribution – responsible for understanding the alternative water stocks so that proactive deliveries could be made from the stations to PSR customers.

During the incident this team met frequently to understand the full picture of alternative water and to share outcomes from Gold / CMT calls. We also created a MS Teams chat which allowed real time information / pictures / issues to be uploaded, shared and, if required actioned. This included:

- Numbers of pallets (updated hourly)
- Restock information
- Numbers of colleagues at each alternative water station
- Update on customer footfall at each alternative water station
- Customer interactions with regard to restoration of supplies / new impacted areas

- Cross-team communication of actions ahead of the calls and to communicate key messages from Gold / CMT

In terms of logistics resource, we had the following fleet made available to us which allowed us to rapidly respond to new areas, manage restocks, maintain a piped supply (through tankers), drop pallets and deliver to PSR customers:

- Vans (and trailers)
- 2 x Internal Curtainsiders
- 4 x Hi Abs
- 40 x Tankers (ranging in size from 13,000 litres to 25,000 litres)
- Personal Cars (used by Volunteers)

We also had security on site overnight to not only protect the alternative water arrangements but also to provide a resource to hand water to anyone who would arrive at the stations out of normal operating hours.

### 3.4.2 Alternative Water Stations – West Wales and Herefordshire

Bottled water stations were first established in West Wales on Saturday the 17<sup>th</sup> December at Llandysul and Newcastle Emlyn. These sites were chosen as they were two of the main towns in closest proximity to the affected areas. Given the rural nature of West Wales, these towns also have the best road links which enabled better management of the traffic and are also easier to communicate the location of the sites through social media / websites.

Following the formation of the Tactical Coordination Group (TCG) and discussions across multi-agency partners we established further stations at Cardigan, Kidwelly and Llansteffan on the 20<sup>th</sup> December. Due to the rural nature of West Wales, the decision as to the location of new sites was based on the travel time to sites already established. The location of any new site was communicated to the public once the station was set up and resourced. Following the notification of a number of properties without water in Aberaeron, we established a further station here on the 21<sup>st</sup> December.

In Herefordshire we were able to bypass the service reservoirs of Mynydd Ferddyn and Llanrwm Wood in order to maintain supplies directly from the respective pumping stations, whilst customers who were supplied from Dorstone and Llanigon service reservoirs had bottled water delivered to them each day until they returned to mains supply.

During the incident, through communication with Local Authorities and our local Distribution teams we also dropped two pallets of water (circa 1000 2l bottles) to several small villages to provide supplies to impacted customers. In some cases (Welsh Newton and Garway) we liaised with the local Councillor and they managed the local distribution to affected residents.

Our Alternative water overview is outlined in Table 3.

Table 3: Overview of Alternative Water Stations and Locations of Pallet Drops

Bottled Water Stations	Pallet Drops (2 x pallets at each location)
<p>17 Dec</p> <ul style="list-style-type: none"> <li>▪ Newcastle Emlyn - Mart Car Park, SA38 9BA</li> <li>▪ Llandysul - St Tysul's Church, SA44 4QS</li> </ul> <p>20 Dec</p> <ul style="list-style-type: none"> <li>▪ Cardigan - Swimming Pool (Fairfield Car Park), SA43 1EJ</li> <li>▪ Kidwelly - Car Park, SA17 4UU</li> <li>▪ Llansteffan, Castle Car Park, SA33 5JY</li> </ul> <p>21 Dec</p> <ul style="list-style-type: none"> <li>▪ Aberaeron - Neuadd Cyngor Ceredigion Penmorfa, Council Office Aberaeron, SA46 0PA</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pisgah, SY23 4NE</li> <li>▪ Pencader, SA39 9AR</li> <li>▪ Hermon, SA33 6SR</li> <li>▪ Cwmdud, SA33 6TR</li> <li>▪ Cynwyl Eiffel, SA33 6XS</li> <li>▪ Garway, HR2 8RJ</li> <li>▪ Llandyfaelod, SA17 5PR</li> <li>▪ Horeb, SA15 5AQ</li> <li>▪ Gorsgoch, SA40 9TE</li> <li>▪ Llanwenog, SA40 9UT</li> <li>▪ Cwrtnewydd, SA40 9YN</li> <li>▪ Newbridge on Wye, LD1 6LN</li> <li>▪ Welsh Newton, NP25 5RW</li> <li>▪ Garway, HR2 8RG</li> </ul>

In terms of closing the alternative water stations, which happened once resumption of supply was confirmed within each area for a sustained period of time, we closed Aberaeron and Kidwelly on the 22<sup>nd</sup> December and Llansteffan on the 23<sup>rd</sup> December. The remaining 3 locations (Llandysul, Newcastle Emlyn and Cardigan) were closed on the 24<sup>th</sup> December. Some of the individual pallets of water we kept in place until Boxing Day when we collected all remaining equipment / alternative water.

### 3.4.3 Alternative Water Stations – Trellech Response

Following the burst main which impacted the Trellech SRV, a further Alternative Water Station was established in Monmouth on the 23<sup>rd</sup> December for affected customers. This station was resourced across the Christmas period and was maintained until the 30<sup>th</sup> December following the closure of our Gold Command.

Similar to our response across West Wales, we also supplemented this Alternative Water station with pallet drops (at strategic locations) and Arlington Tanks (static tanks) to a number of local farms within the area to maintain supplies to livestock.

### 3.4.4 Alternative Water Planning Thresholds against Actual Response

We met our thresholds for SEMD with regard to providing sufficient alternative water within the timescales in the Emergency Planning Guidance.

West Wales is defined as a rural location within SEMD (*Annex C of the EP Guidance*) and so our thresholds for provide alternative supplies is 10,000 customers within the first 24 hours and 20,000 customers within the first 3 days (as a minimum) of an incident being declared.

Table 4 outlines the minimum number of Bottled Water requirements (in litres) we need to make available against these thresholds compared with the number of litres we did make available over the incident. These calculations are based on providing 10 litres per person per day (for 24hrs and 3 days) and offering 20 litres per person per day (after 5 days):

*Table 4: Minimum Requirement for Alternative Supplies against Actual Alternative Supplies available*

<b>Bottled Water*</b>	<b>24 Hours (SEMD)</b>	<b>24 Hours (Provided)</b>	<b>3 Days (SEMD)</b>	<b>3 Days (Provided)</b>	<b>&gt;5 days (SEMD)</b>	<b>&gt;5 days (Provided)</b>
Litres	100,000	146,832	200,000	493,488	400,000	871,056

During the incident, we also deployed a number of our Arlington Tanks to supplement the bottled water at deployment stations and to local farmers to support livestock (Table 5).

*Table 5: Arlington Tank Deployment*

<b>Arlington Tank (1000 litre tanks)</b>	<b>24 Hours</b>	<b>3 Days</b>	<b>&gt;5 days</b>
Litres	n/a	10,000	25,000

As outlined in Table 5 we met our SEMD threshold for 24 hours, 3 days and 5 days. This information will be validated as part of the independent review being undertaken by Jacobs engineering.

### 3.5 Vulnerable Customers & Sites

Our aim is to make sure that we always give the best service possible to all our customers. For those who have requirements due to their age, health, or a medical condition for example, we offer several priority services that they can register for, one of which is the provision of bottled water for health. These services are widely promoted, as evidenced by the fact that as an organisation, we have already achieved our PSR AMP reach target, with over 140k customers signed up. With the support from various community groups, we have also recently achieved the BSI 18477 inclusive services standard for supporting customers in vulnerable circumstances.

The details of customers' who have registered for one of our priority services are then entered onto our Priority Services Register (PSR). Customers who need water because of a medical condition such as home dialysis are categorised as P1 (priority 1) customers and are contacted immediately if they are affected by a supply interruption, so we can understand if they need us to deliver bottled water straight away, or if they have made other arrangements.

Customers who have registered for bottled water to be delivered, for non-medical reasons, if their supply is interrupted are categorised as P2 (priority 2) customers, and our intention is to provide bottled water to them after 4 hours, where we can.

As explained in section 2.5 we proactively contacted all our PSR P1 customers as part of our weather preparation, explaining that it may be prudent for them to store some water.

During the incident we proactively delivered to all our P1 PSR customers and supported our P2 customers when they contacted us or when we had resource availability in their area to deliver to them. Where possible we also supported any customers who were in a temporary need for support (e.g., a household with young children).

We have a total of 179 P1 customers within the affected areas, after speaking to these customers, 30 of these customers told us they did not require bottled water when we contacted them. This was either because they had water or had been able to get bottled water themselves. The remainder had regular deliveries throughout the interruptions within their areas.

To manage our PSR deliveries we instigated our structured alternative water response process, which tracks the total volume of bottled water available and then allocates resources required for PSR deliveries and the supporting of bottled water stations. During the incident we delivered bottled water to over 3,000 customers. To put this number of deliveries into context, alongside the 179 P1 customers in the impacted areas, there were also a total of 3,831 P2 customers.

In addition, we worked closely with the local resilience forum and through this, Ceredigion Council helped to delivery bottled water to 26 'vulnerable sites'. These included several care homes, adult service centres and drug and alcohol recovery teams.

### 3.6 Regulatory Engagement

Our direct route for incident notification is through Welsh Government which we did on the 17<sup>th</sup> December. We maintained daily liaison with them over the period of the response. We were also inputting into the National Incident Management (NIM) Group Freeze/Thaw daily SitRep and providing updates to Defra / Welsh Government and Water UK through these channels and the NIM and Platinum Incident Management (PIM) Group calls.

Our CEO also wrote to Julie James, MS Climate Change Minister, to appraise her of the incident and our response (see Appendix 3).

We also notified and updated Gwenllian Roberts, Director of Wales for Ofwat, throughout the incident. This was undertaken through Eleri Rees our Strategy and Regulatory Director. In addition, our CEO also sent daily emails to David Black CEO Ofwat and Gwen Roberts throughout the incident.

In accordance with the Water Industry (Suppliers' Information) Direction 2021, we notified DWI on the 18<sup>th</sup> December (initial notification) and provided a further update on the 22<sup>nd</sup> December (72-hour report). Our 20 Day Report was submitted to DWI on the 31<sup>st</sup> January which also included additional responses around SEMD, and lessons learnt.

With regard to our engagement with the Local Resilience Forums, we called a Tactical Coordination Group (TCG) meeting with Dyfed Powys on Mon 19<sup>th</sup> December following identification of the breadth of the response required in West Wales. These meetings were chaired by DCWW, and we agreed a daily battle rhythm through the week. Each TCG had a completed Action Log which was shared with all attendees. Following the session on the 23<sup>rd</sup> December it was agreed that no further calls were required over the Christmas period, but a further TCG meeting would be held on the 28<sup>th</sup> December. Following this meeting it was agreed the TCG could be stood down.

We also called a TCG for Powys on the 19<sup>th</sup> December, however this was a stand-alone meeting to understand issues in Powys. All other correspondences were through the Dyfed Powys TCG.

For the impacted areas in Herefordshire, we had a meeting with members of Herefordshire Council on the 21<sup>st</sup> December. This wasn't a formal TCG but an opportunity to share information on the incident and gain an understanding from both sides as to the incident impacts and response. There were no further formal meetings, but updates continued to be shared via email.

We have since held lessons learnt sessions with both Dyfed Powys LRF and Herefordshire Council. Following the incident at Trellech, an informal debrief was held with Monmouthshire Emergency Planning team.

All agreed actions will either be progressed through the LRF or directly through DCWW (Section 5).

### 3.7 Stakeholder Engagement

When operational incidents occur, our Communication Team is engaged from the outset and embedded within Gold Command and other operational teams to ensure a flow of timely and accurate information is communicated to key stakeholders. The team has a Communications Incident Manual in place which outlines the activities it will undertake proactively to manage communications with stakeholders during such incidents on an ongoing basis.

When the incident commenced, a list was compiled of all the key stakeholders in the affected areas that would need to be communicated with and provided with updates. These included:

- Local MPs and MSs
- Local councillors
- Council Leaders
- Chief Executives of local councils
- Welsh Government Minister and officials
- Secretary of State for Wales and Wales Office
- Other interested parties i.e. CCW, Independent Challenge Group

From the outset, we proactively engaged with all stakeholders at regular intervals as the situation progressed. This included email updates, telephone calls, text messages and virtual meetings. We set up virtual meetings with the Chief Executives/senior elected representatives of the local authorities which were attended by our Managing Director of Water Services. We also provided communication updates to the Local Resilience Forums.

Having established contact with the local MPs, MSs and councillors, many would then call members of the Communication Team directly with specific queries relating to either areas or individuals without water. The queries were then escalated to the Gold response team for further investigation and updates provided to the relevant stakeholder.

It should be noted that it was identified early on by the Communications Team that the areas affected were ones where a high proportion of the population speak Welsh, hence the team ensured that Welsh speakers were allocated to managing the communication with the stakeholders. This proved invaluable in enabling the stakeholders, many of whom are first language Welsh speakers, to converse with DCWW in their native tongue – which is essential during prolonged incidents such as this.

In addition to broadcast media interviews, we also produced our own bilingual videos with spokespeople from the company providing updates on the situation. These were shared through our social media channels.

### 3.8 Customer Communication and Contact Handling

Our Operational Contact Centre (OCC) manages our customer contacts and usually handles around 650 contacts a day (less at a weekend). During the peak of the incident (19<sup>th</sup> December) over 2,200 contacts were handled. We had anticipated an increase in customer contact and therefore trained an



additional 100 members of staff to ensure we were able to handle the additional contacts. As well as contacting us by telephone, customers were also able to contact us via LiveChat, various social media channels and by completing a webform on our website.

To help us manage the number of telephone calls we used our 'Incident Message Manager', which is a bespoke recorded message, giving specific information about an incident. Some customers are happy with the information given in these messages and therefore do not need to talk to an advisor. However, there is an option for all customers to talk to us after listening to the message if they need to. An example of a message we used (from 22<sup>nd</sup> December) is below.

*We're currently experiencing a very high volume of calls, and the wait time to speak to one of our agents may be longer than 20 minutes. If you are calling about frozen taps or pipes, or for non emergency issues please visit our website at [www.dwrcymru.com](http://www.dwrcymru.com). If you need to speak to us, please be patient. We're doing everything we can to answer your call.*

We also used our 'mass text' facility to update customers about incidents that may be affecting them. The system sends a text message to a mobile phone and voice message to a landline. During the period 15<sup>th</sup> December – 1<sup>st</sup> January, just over 180,000 messages were sent to customers. An example of the types of messages we send can be seen below:

*Welsh Water would like to inform you that your water supply may be off or you may have low pressure due to a burst water main in your area. Supplies should be restored later this evening. If you experience discolouration please run your cold kitchen tap until it clears.*

*We're sorry you may have no water, or low pressure. It should return later this evening. For further updates click here <https://www.dwrcymru.com/iya>*

This particular message was sent to almost 1,600 customers in the Cardigan area on 21<sup>st</sup> December at 15:40.

We also updated our website with information about the incidents that customers could view (Fig. 8).

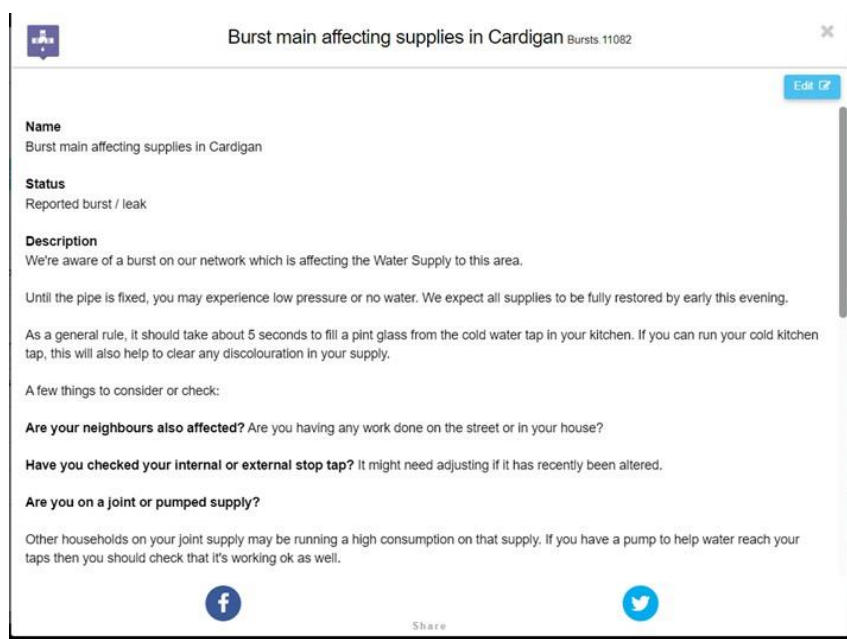


Figure 8: Example of Website Update

As the incident progressed, we created a dedicated 'freeze/thaw' area on our website, which was accessible from our home page and kept it updated throughout. This area included information from our CEO. This area was mainly used to keep customers updated who had been off supply for several days.

An example of one of the updates contained on this dedicated page is contained below:

### **8am Monday 19<sup>th</sup> December – content update**

#### **Operational issues affecting Pencader, Lampeter, Llanysul, Aberaeron & surrounding areas of West Wales**

We are aware of operational issues affecting Pencader, Lampeter, Llanysul, Aberaeron & surrounding areas of West Wales which is affecting the supply to our customers in this area.

We will continue to work through the day to restore supplies as soon as possible.

If any customers need water this morning, we have bottled water available to collect at:

- **Church street car park, Llandysul, SA44 4QN**
- **Newcastle Emlyn, SA38 9BA**

For more information and updates, [please click here](#).

We apologise for the inconvenience caused.

This new area of the website was viewed some 25,000 times throughout the incident.

### **3.9 Media Relations**

Media interest in incidents is inevitable and the Communications Team, as part of their Incident Manual, has processes in place for managing this.

During the course of the incident, there was interest from Wales national media (print and broadcast) alongside regional and local media serving the areas affected.

During the course of the incident, we received and responded to 18 media queries. We also agreed to broadcast media interview requests which were fronted by our Chief Executive Officer. We also undertook Welsh language broadcast media interviews so again reaching the Welsh speaking customers in the area directly.

### **3.10 Customer Minutes Lost (CML)**

We recognise that with a large rural network coupled with the challenges of topography and high operating pressures dealing with supply interruptions can be challenging. However, against these factors we are striving to improve performance. The December 2022 freeze / thaw has clearly adversely and significantly impacted our supply interruption performance for 2022/23, with approximately a 12 minute impact on our annual target from this one event. We have, in this report, outlined the factors that caused a sudden depletion of water from our water network in the rural areas worst affected. We have a strategy and action plan aimed at improving performance for this measure, this having been previously shared with Ofwat at the performance meeting on 27th January 2023.

There are some aspects of this plan which have direct relevance to the freeze / thaw and are linked to the improvements we made following the 2018 ‘Storm Emma’ experience. These improvements have given us widespread monitoring across our entire network which in the December incident enabled accurate targeting of resources to find and fix leaks. It also enabled us to help identify customer side leaks and for them to be either shut off or highlighted to owners to effect repairs. This is an important factor as we estimate that 60% of water lost from the network was from these types of leaks. However, even with this level of monitoring, the rapidity of the depletion of water in the mains network was a significant challenge.

Taking action to improve supply resilience is a key part of the plan especially for ‘worst served’ customers. This will always include the fastest, safest response to supply interruptions but we plan to back this up with a review of strategic storage in the areas worst affected by the more recent freeze thaw. This is particularly pertinent in the Ceredigion area where we are planning to assess and where necessary increase treated water storage in the area - our aim is to achieve this in AMP 7. Our PR24 plans also include targeted replacement of asbestos cement water mains in this area. In the meantime other actions such as a review of pressure management and installation of more air valves on the network are aimed at reducing burst frequency on the system.

Our Supply Interruption Improvement plan (Table 6) is based around five key strategic initiatives.

Table 6: Supply Interruption Improvement Plan

Strategic Initiative	Activities in 2022 – 23
Prevent	<ul style="list-style-type: none"> <li>• Pressure management – utilisation of logger estate to stabilise the wider network, focussing on education of large commercial users to minimise pressure transients (learning from previous events).</li> <li>• Hydraulic modelling – we will continue to use hydraulic data to ensure planning, mitigation and response is well informed.</li> <li>• Training of third parties using our network Training Rigs (Jetters, Fire Service etc, hire standpipe users).</li> </ul>
Predict	<ul style="list-style-type: none"> <li>• Following installation of over 4000 pressure loggers for our Network Event and Anomaly Detection System (NEADS) – Project to be developed to allow predictive capability of bursts from our pressure monitors.</li> </ul>
Respond	<ul style="list-style-type: none"> <li>• Work collaboratively alongside Smarthub (Control Room) transformation project to explore opportunities to provide enhanced triage and analysis 24/7, utilising distribution staff alongside Smarthub analysts and In house modelling team.</li> <li>• Ensure alignment with repair teams and CML response strategy.</li> </ul>
Innovate	<ul style="list-style-type: none"> <li>• Data and reporting - build on existing CML root cause analysis tool to enhance understanding of events and allow for more effective timeline profiling.</li> <li>• Creation of smartphone pressure capture application to allow for better incident management and post incident review.</li> <li>• Explore the opportunity to use hydraulic modelling to establish CML impact after significant events to break down impact to a more granular level.</li> </ul>
Invest	<ul style="list-style-type: none"> <li>• Targeted investment in our Worst served customers: assessing and improving resilience through increased treated water storage and addressing repeat asset failures focusing on AC rural pipes.</li> </ul>

- Continued focus on mains bursts by the Upstream losses team to minimise the risk of a reactive, catastrophic failure.
- Investment in Air valve replacements in rural areas to minimise the impact of failing AC networks.
- Zonal Study programme replacing cast iron pipes in poor condition (primarily impacting Acceptability of Water).
- Completion of the feasibility design of the West East transfer main to mitigate loss of supply around Cardiff.

## 4 Customer compensation

On Thursday 22<sup>nd</sup> December we posted an open letter on social media and our website apologising to customers, explaining what had happened and what payments we would be making in the new year (see Appendix 4).

In order to make the payments to customers as quickly as possible we took a practical approach to identifying for how long customers had been without water. This involved reviewing the data available for all the Leakage Controlled Areas (LCAs) that had been impacted by the event. This included pressure data logger information, the elevations of properties in relation to the pressure loggers to determine an estimate of pressure at each and customer contacts from the area. From this we identified the properties that had been without water for more than 12 hours and the maximum amount of time we believed any customer had been without water in the LCA. As supplies had often been intermittent for customers, we decided to pay customers for the maximum period the LCA had been without water. This approach was taken for most of the impacted customers as we wanted to make the payments as quickly as possible.

Customers received the payment via a direct transfer to their bank account (where we had their bank details), via a cheque, or by applying a credit to their water bill account with us.

We started sending the letters and making the payments to customers on 17<sup>th</sup> January 2023, completing the exercise on 10<sup>th</sup> February (albeit from our customer minutes lost analysis we believe we may [still] identify isolated properties that have been missed from our original analysis). A total of 15,313 payments have been made to date: approximately 11% of these are non-household customers and the remainder are household customers. The current value is £2,580,292.

### 4.1 Household customer compensation

All household customers impacted by the incident received a letter from us (see Appendix 5), based on the open letter we issued before Christmas.

We have paid an enhanced amount above what the GSS regulations require (as amended by Ofwat following the 2018 incident), for each full 12-hour period customers were without water. The GSS amount is £30 and we have paid an additional £5 to cover any incidental expenses such as purchasing bottled water, or fuel costs to travel to an alternative water station.

### 4.2 Business Customer compensation

All non-household customers were issued letters confirming supply disturbance and GSS payments due to the value of £75 for each 12-hour period off supply. 1,700 payments were issued and within GSS payment notification letters, non-household customers were advised that business customers may apply for additional goodwill payments where they had suffered losses or additional costs

associated with the loss of supply. To date we have received 12 claims, 3 of which are complete and the remaining 9 in progress.

## 5 Lessons Learnt and Post incident Review

### 5.1 Lessons Learnt from Previous Freeze / Thaw events

#### 5.1.1 OFWATs Out in the Cold Report 2018

Following the 2018 Freeze / Thaw, OFWAT asked all companies to provide a detailed overview of their full response to the event. The OFWAT Out in the Cold report was published in June 2018 alongside a specific DCWW response letter.

As part of the Out in the Cold Report, Ofwat included the information from;

- Each water company giving a detailed explanation of what happened;
- Consumer Council for Water, who carried out research on customers' views of the incident;
- A broad range of stakeholders to understand their views and experiences; and
- Customers for their stories to help better understand the impact of the incident on them

In response, DCWW produced an Action Plan under the following themes:

- Planning and preparation, and incident response
- Communication with customers and key stakeholders
- Customers in vulnerable circumstances
- Compensation

In total 30 Actions were split across these 4 themes. All of these Actions have since been completed and provided improvements to our 2022 response: some these included:

- Investment in the network to remove common 'pinch points' and high-risk mains. An example being St David's which following improvement work saw no issues during this incident.
- Incident Support process (Volunteers) to support operational team's complete tasks such as tanker operations, bottled water deliveries and logistic activity.
- Improvements to our logistic fleet for bottled water delivery.
- Improvements in alternative water included increased bottled water storage and the replacement of the previous static tanks with Arlington Tanks.
- Much improved approach around social media and customer messaging.
- Trained and competent Retail colleagues formed part of our Silver response team.
- Improved visibility and data capture around our PSR customers including the creation of a dedicated Vulnerable Customers team sitting within our Retail function.
- Better interaction with LRFs to manage expectations and concerns raised through multi agency partners.
- Winter Plans introduced across all operational and support teams which have DCE level oversight and sign off.
- Introduction of a full day internal exercise to validate Winter Plans against a pan Wales scenario.
- Improved incident management processes, including a fully new Incident Response Manual, Emergency Plans, Gold and Silver Manager training, annual exercise programme and sector wide engagement through NIM and PIM.

5.1.2 The DWI’s report ‘Consolidated review of the widespread loss of supplies arising from the freeze/thaw affecting England and Wales in March 2018’ dated 19 June 2018.

DWI produced their own report following the 2018 event, the relevant recommendations made within this report are outlined alongside our 2022 response (Table 7).

Table 7: DWI Recommendations and DCWW Response (2022)

DWI Recommendation	DCWW Response for Freeze / Thaw 2022
<p>The Inspectorate reminds companies of the information requirements for final event reports as outlined in the Inspectorate’s published guidance. We <b>recommend</b>, therefore, that all water companies review their arrangements for reporting of sufficiency of supply events, particularly in relation to providing the actual area and population affected and including location maps of investigatory samples collected following the restoration of supplies.</p>	<p>We notified DWI on the 18<sup>th</sup> December (initial notification) and provided a further update on the 22<sup>nd</sup> December (72-hour report). Our 20 Day Report was submitted to DWI on the 31<sup>st</sup> January which also included additional responses around SEMD, and lessons learnt.</p>
<p>We <b>recommend</b>, therefore, that all water companies review their levels of preparedness to cope with severe, but not unforeseeable, weather events.</p>	<p>Since 2018 all operational and support teams produce Winter Plans to ensure a level of response capability. These plans are signed off at DCE level.</p>
<p>The Inspectorate <b>recommends</b>, therefore, that water companies review the adequacy of current arrangements for meeting their statutory requirements for provision of alternative supplies, including procurement of bottled water stocks, during widespread insufficiency events such as this.</p>	<p>Since 2018 we have improved the resilience of our alternative water requirements including increasing our internal storage requirements and also the number of contracts we have with the bottled water supply chain.</p>
<p>We <b>recommend</b> that all water companies review their own capacity, and that available within mutual aid requirements, for dealing with events of this type.</p>	<p>We were able to respond to this incident using our own resources without any requests for Mutual Aid.</p> <p>A number of mutual aid requests were received across the sector during this period. Whilst DCWW was not in a position to provide a resource response, we did ensure a quick response to the requesting company to allow them to understand our situation.</p>

<p>The Inspectorate <b>recommends</b> that all companies review their preparedness and ability to respond to forecasts of severe weather that may present a risk to sufficiency of water supplies, to limit the scope and duration of potential consequences for consumers.</p>	<p>As mentioned above all operational and support teams complete a review of their Winter Plans ahead of DCE sign off</p> <p>To validate these plans we complete a full day exercise to better understand our preparedness capabilities and to identify improvements in the plans ahead of the winter period.</p>
<p>We <b>recommend</b> that all companies review their contingency plans to ensure their treatment assets and sites are resilient and that critical failure points are identified and feed into their risk assessments for extreme cold weather events.</p>	<p>Apart from one operational issue, we had no significant impacts on our treatment assets during the period. Where we felt a risk these sites were supported 24/7 so we had the ability to respond quickly so there was no impact on the production of water.</p>
<p>We <b>recommend</b>, therefore, that all companies review the resilience of their water supply networks to withstand significant weather related challenges.</p>	<p>We mobilised our Silver teams a week ahead of the predicted freeze thaw to ensure our network was adequately prepared.</p> <p>In addition following investment into the network in the West, we did not see a recurrence of the scale of the issues seen in 2018.</p>

### 5.1.3 National Incident Management (NIM) Group

There were a number of recommendations with regard to the response from NIM / PIM following the Freeze / Thaw 2020/21 (Water UK report). These were implemented as part of the sector response and DCWW were heavily involved in:

- Providing a Daily SitRep (BRAYG) specifically for Freeze / Thaw impacts which was then escalated to PIM for discussion.
- Maintaining the Weekly SitRep for wider Winter reporting.
- Compiling Mutual Aid requests for escalation to PIM if required.

Our CEO and Managing Director of Water, Asset Planning & Capital Delivery were also representing DCWW at the Platinum Incident Management (PIM) Group across the duration of the incident.

## 5.2 DCWW Internal Post Incident Review (PIR)

The Post Incident Review was completed on the 27 January 2023 at an off-site location in Cardiff. Attendance included all teams involved in the response including:

- Water Distribution
- Retail
- Water Production
- Communications
- Water Engineering
- Emergency Planning

- Water Logistics
- Capital Delivery
- Water Quality
- Gold Managers\*
- Water Network Alliance
- Silver Managers\*

\*as defined within our Incident Response Manual (IRM)

Also in attendance was our:

- Managing Director of Water, Asset Planning and Capital Delivery (Chair)
- Water Services Director
- Operational Services Director

From the learning identified through this PIR a list of high level recommendations and specific actions were agreed along with owners (Section 5.4). For all of the recommendations, a full scope of work activities will be provided to our Water Services and Operational Services Director by the end of March for review and sign off.

The specific actions will be added to our internal Incident Action Tracker and progress tracked through the Incident Response Group. This Group meets monthly with escalation in place up to Director level to ensure actions are completed within the agreed timeframes.

The full PIR Report is provided in Appendix 6.

### 5.3 LRF Debrief Sessions

#### 5.3.1 Dyfed Powys LRF

Following the closure of the Tactical Coordination Group (TCG), as the Chair of the TCG we requested a structured debrief was undertaken focusing on a number of key response areas:

- a) Communication from DCWW (Stakeholders and customers) – what went well/what didn't go well?
- b) Alternative water provision and bottled water collection points – what went well/what didn't go well?
- c) DPLRF to DCWW interactions – what went well/what didn't go well?
- d) Proactive customer messaging – what went well/what didn't go well?
- e) Advice between agencies – what went well/what didn't go well?
- f) Recommendations for future incidents?

The debrief was conducted virtually on the 20 January 2023 and chaired by Dyfed Powys Police with representation from multi agency partners who were involved in the TCG. The learnings will be tracked through LRF meetings and within DCWW.

#### 5.3.2 Herefordshire Council and Monmouthshire Council

We also have held lessons learnt sessions with Herefordshire Council and Monmouthshire Council following the issues experienced in rural Herefordshire and the incident at Trellech.



## 5.4 Post Incident Review Recommendations

The outputs from our internal PIR and the learning identified from LRF debriefs were split between high level Recommendations which would be taken forward through a working group and specific actions which would be completed by individual teams within DCWW.

### 5.4.1 Recommendations

Unless otherwise stated all Recommendations (Table 8) have a completion date of the end of March 2023. This is for the Owner to establish the working group, hold the initial meeting and agree a more detailed scope of work with individual timescales.

Table 8: PIR Action Summary

Recommendation	Owner	Completion Date
Set up a Working Group to incorporate the colleague feedback into our Incident Support (volunteers) process	Emergency Planning	March 2023
Incorporate the incident learning into our Alternative Water response including type of alternative supply, resource requirements and team structure	EP / Water Distribution	March 2023
Review customer feedback and internal challenges to identify improvements in responding to PSR customers and the management of expectations	Retail	March 2023
Customer Communications – explore the improvements we can make to ‘In Your Area’ so that it provides more real time information and increases the scale of the information to aid stakeholder partners	Communications / Retail	April 2023
Complete a review of our hydraulic models and outline an Action Plan to improve the level of understanding within the areas impacted so investment can be identified to improve network capacity	Water Assets / Distribution	February 2023
Agree the level / type of information and construct appropriate dashboards which can be made available within our Gold and Silver command rooms during incidents	Operational Services	March 2023
Review and undertake a gap analysis of the current Distribution / Production maintenance programme	Distribution / Water Assets	March 2023
Improve visibility, data capture and level of information around vulnerable sites	Retail / Emergency Planning	March 2023
Outline suitable timeframes and take ownership of the Actions agreed following the debriefs from the Local Resilience Forums	Emergency Planning	February 2023

Incorporate the learning from this incident into our Leakage Strategy	Water Engineering	March 2023
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#### 5.4.2 Specific Actions

These specific actions (Table 9) will be owned and completed by individual teams and will improve elements of our response during future incidents.

Table 9: Specific Actions to be completed by Individual Teams

Action	Owner	Completion Date
Engage with the National Farmers Union (NFU) around support during incidents and alternative water offerings	EP / Distribution	Responded to a NFU letter asking for a meeting to discuss
Create a specific advice leaflet for issuing to customers taking water from an Arlington Tank	Emergency Planning	February 2023
Agree bottled water contracts with Princes Gate and Decantae to provide further resilience	EP/ Procurement	March 2023
Identify how the new Incident Communications email will be used for future incidents	Comms / EP	March 2023
Explore options to increase the timeline of identifying pre-agreed suitable locations for alternative water deployment	Emergency Planning	February 2023
Produce SitRep templates which can be used to where increased frequency of updates are required to stakeholders / regulators	Emergency Planning / Water Quality / Communications	April 2023
Review Winter communication campaigns to factor in learning from the incident and any specific messages we want to include for winter 2023	Communications	April 2023

#### 5.5 Independent Review

We have commissioned Jacobs Engineering to undertake an independent review of our performance. This review will be undertaken in two parts as per Jacobs's outline of their brief as follows:

##### Phase 1

Conduct a 'critical friend' review of your response. This will start with a project inception meeting between the Phase 1 leads and the Dŵr Cymru project manager, with activity comprising:

- a. Off-line review of proposed submission, including consistency check with requirements of Ofwat letter and expectations (such as 2018 Out in the Cold report) plus consistency with your previous submissions / publications.

We have since held a feedback session with Jacobs to discuss their observations on our draft response and of our PIR Report with learning and feedback incorporated into the final documents.

## **Phase 2**

Phase 2 of the project will commence on the 27 February, with activity comprising:

- b. Kick-off meeting with Dŵr Cymru project manager and emergency planning team to set expectations and confirm detailed scope and timings.
- c. A desktop review of DCWW evidence and data, lessons learned, previous plans and the Ofwat response
- d. Development of pro-forma/questionnaire for meetings with operational teams.
- e. Meetings (over MS Teams) with up to 5 operational teams with the outputs documented and agreed. We have confirmed that our Emergency Planning, Distribution, Water Engineering, Retail and Comms teams will be represented at these sessions. We are also having a separate session with our Gold Managers.
- f. Comparison with publicly available information from other companies
- g. Detailed report and formal presentation of the report's findings to Dŵr Cymru team(s).

The timeline for this review will be the end of March 2023 and the findings of the report will be incorporated into the wider DCWW Action tracker (as outlined in Section 5.2).

## **5.6 Independent Challenge Group Review**

Alongside the independent reviews from Jacobs, we have engaged Peter Davies, who is the Chair for the DCWW Independent Challenge Group (ICG) to undertake a review of our findings, with a particular focus from a customer perspective.

The review, supported by the Independent Challenge Group (ICG) will focus on the customer perspective, in particular Dwr Cymru's:

- Preparation to support customers in advance of the event.
- Communication with customers before and during the event
- Effectiveness in providing alternative supplies.
- Fulfilling of obligations to vulnerable customers and those on the priority services register.
- Arrangements for compensation for domestic and business customers.

Peter has provided an initial response to the incident. His key findings include:

1. The weather conditions over the period were exceptional as measured against national weather data, in particular the sudden rise in temperature following a long cold spell.
2. There was significant interruption to water supply for over 15,000 customers, with over 10,000 losing water for 2 days or over.
3. The company had undertaken preparations for winter and adopted learning from previous events, but the nature of this event put extreme stress on systems, which were not always able to cope with the challenge.

4. Up to 60% of the water loss leading to supply issues has been attributed to customer side leakage, with causes related to the rural nature of the area.
5. Appropriate support for priority service customers was provided, with early action being taken to contact those in potential risk in advance of the event.
6. Many of the customers most affected were first language Welsh speakers and the company was able to provide advice and support in Welsh.
7. The rural nature of the area and distances involved resulted in problems over the distribution of bottled water supplies.
8. While communication systems were in place there were significant gaps in providing information to the level that customers wanted and, in some cases, giving inaccurate reports on when supply would be restored.
9. The engagement with local stakeholders, in particular local councillors, was critical, sometimes providing more accurate on the ground information than was available through company systems.
10. Customers were in general understanding of the challenges faced by the company, with a number of positive comments being registered on the web site. The Consumer Council for Water have noted that “We saw no increase in contacts resultant from freeze/thaw and felt that the company’s communication with us was of a good standard”
11. The early apology along with comprehensive compensation has been well received by households and businesses.

These points will be further explored through in-depth interviews with key community representatives from the affected area. A final report will be discussed with the ICG before submission to DCWW by the end of March. This report will then be made available on the ICG website page.

The initial findings from ICG are contained within Appendix 8.

## 5.7 Key Learning - Modelling Approach

The network across Ceredigion supplied by Strata Florida Treatment Works in the North and Llechryd Treatment Works in the South has seen depleted storage during the drought conditions experienced in 2020 and 2022, the staycation impact following the pandemic in 2021 and the freeze thaws in 2022 and following Storm Emma in 2018. In all these occasions there has been frequent tankering to the Synod Inn and Rhosymysyn service reservoirs to maintain storage. We have been addressing our least resilient network areas in a systematic planned manner, which has included significant infrastructure improvements in the South West of Wales, (for instance in the St Davids area and reinforcing the supply to the West over the Cleddau Bridge), however, more remains to be done. Plans are in place to further reinforce the system as part of our AMP8 programme and a significant modelling programme is underway to identify solutions and prioritise what could be brought forward into AMP7.

Similar patterns have been experienced in parts of Pembrokeshire and hydraulic modelling undertaken in the area pinpointed the need for network reinforcement and additional pumping with investment schemes delivered in late 2021. These schemes have meant conurbations around Solva and St Davids no longer require tanker support to maintain storage during peak demand periods.

Taking the learnings from the finding of the network analysis in Pembrokeshire we are repeating this analysis of the Ceredigion system which will involve the building of a full strategic mains model to allow simulations of how the network has responded to high demand periods and identify the investment options to be delivered over the short term through to 2025 ((AMP7) and the medium

term up to 2030 (AMP8) to improve the network response. It is envisaged this will look at treatment, storage, and network reinforcement options.

Hydraulic modelling scenarios will be run for the areas affected during the freeze thaw event. These scenarios will consist of:

1. Stripping the model back to focus on the trunk mains, WPS, SRVs and inlet to the LCAs. This is to identify any areas where capacity of the infrastructure feeding the affected areas is undersized for the typical high demand. Scenarios run in the model will identify possible solutions through upgrade or interconnectivity if possible.
2. Updating the models with the flows from the weekend of 16<sup>th</sup>—18<sup>th</sup> December. This will identify any further upgrades to satisfy the extreme demand seen over this short period, highlighting the potential for upgraded storage or pump capacities or other mitigations.
3. Review of deterioration modelling for this area to understand the impact this may have over coming years, until a significant mains replacement programme for the predominant asbestos cement mains in the area is delivered.

Specific areas to be modelled are presented in Table 10.

*Table 10: Specific Areas to be Modelled*

Asset Name	Water Quality Zone	Comment
Mynydd Crogwy SRV / Crugiau SRV / Gorllwyn SRV	D24 Llechryd	Have had to tanker to Mynydd Crogwy and Crugiau SRV's during recent warm weather events, which also affects Gorllwyn SRV.
Mynydd Crogwy SRV	D24 Llechryd	Limited storage at Mynydd Crogwy, the capacity is 2472m3, additional storage is likely to be required with current flows. This would increase resilience when Llechryd WTW has emergency shut downs / high demand / freeze - thaw periods.
Hafod SRV	D24 Llechryd	Limited storage at Hafod SRV, the capacity is 2600m3, additional storage is likely to be required with current flows. This would increase resilience when Llechryd WTW has emergency shut downs / high demand / freeze - thaw periods.
Synod Inn SRV / Rhosymyrson SRV	D24 Llechryd	Issue moving quantities of water around the network to maintain levels during winter freeze / thaw and summer high demand
Mid South system air valves	D24 Llechryd / D16 Strata	During the thaw airlocks prevented rapid re-establishment of flow, locations of air valves to be reviewed.

Mid South system PRVs	D24 Llechryd / D16 Strata	High number of Pressure Reducing Valves (PRVs) within the system, location and type of PRV to be reviewed.
Penllanfoss WPS	D29 Capel Dewi	Maximum capacity pumped from Penllanfoss WPS to Foel SRV, Foel SRV has been impacted during recent high demand events staying at a low level for several weeks.

## 5.8 Comparison with Previous Severe Winter Weather Events

To put the December 2022 cold spell and rapid thaw into historical context a comparison has been undertaken of temperatures recorded during this period with past events.

A cold spell in this analysis is defined as a spell of at least six days in which the mean Central England Temperature (CET) was below zero, December 2022 had 10 days where the mean CET below was zero. Analysis has been completed along the same approach as undertaken following the most recent cold spell in 2018. A start-year has been chosen as 1947, so as to allow comparison of both 1947 and 1963, the coldest winters in the UK of the 20<sup>th</sup> century.

31 cold spells were identified between 1947 and 2022. The severity of an event was assessed on the accumulated temperature principle. Having defined the duration of each spell, the intensity is defined simply as the sum of the mean daily CET. Any days with an above zero mean temperature will act to weaken the severity of the spell. The 2022 event was ranked 19<sup>th</sup> out of 31, however most notable was the rapid rate of change between the last cold day of the spell with the first thaw day which saw an increase in the average daily temperature of 6.7°C, the greatest rate of change for all events back to and including 1947.



# Exercise Winterfell Report

November 2022



## CONTENTS

INTRODUCTION.....	4
EXERCISE BACKDROP .....	4
EXERCISE SCENARIOS & TIMELINE.....	5
TESTING OF INCIDENT PLANS, PROCESSES, PROCEDURES.....	9
DEBRIEF CONTRIBUTORS.....	9
DEBRIEF SUMMARY .....	10



## EXECUTIVE SUMMARY

This report provides an overview of the 2022 Winter Preparedness exercise conducted on the 22 Nov.

Last year saw the second winter preparedness exercise delivered to determine the company's level of preparedness and rehearse response plans ahead of the winter period. It focused on severe weather and flooding affecting business operations against the backdrop of COVID-19 and HGV driver shortages.

We continued the severe weather theme this year through a Amber and then Red weather warning for snow whilst including scenarios such as the ability to deal with concurrent incidents, access issues to key sites, loss of power, strategic bridge closures. We also jumped the exercise forward 24 hours to simulate significant number of bursts on the network due to freeze thaw.

We also used the exercise to test the Incident Response Manual (IRM), incident situational reporting process, and command and control arrangements outlined in the Widespread Incident Response Plan.

The exercise was successful in achieving its aim and objectives. A hot debrief was conducted immediately post exercise to capture any learning and feedback from those involved and a number of positive comments were received including:

- Players feel more prepared should they need to activate their winter plans and more confident about their response arrangements
- Players gained good experience in incident management roles and provided an opportunity for less experienced colleagues to up skill
- Very good engagement and buy-in from players who demonstrated good teamwork and communicated well in silver and between each other
- Good focus on H&S, PSR customers, comms and wider response
- Prepared Burst Response Plan in place for Kinmel WwTW worked well and proved beneficial

From the feedback a number of actions were identified, including:

- Review suitability of silver rooms to make sure they are suitably located, equipped and facilities are working
- Provide Loggist training to improve knowledge of the sitrep process and build this capability within operational teams
- Raise Ops awareness about the Wholesale Service Centre and Open Water customers including their requirements during incidents

## INTRODUCTION

This report provides an overview of the 2022 Winter Preparedness exercise conducted on the 22 Nov.

### Aim

The purpose of the exercise is to test the company's Winter Preparedness Plans and ability to deal with concurrent incidents affecting business operations during a severe weather event.

### Exercise Scope

The exercise exercises local operations winter plans and preparations ahead of the winter season to ensure procedures, processes, services, and stockpiles are in a state of readiness. The exercise included the use and/or reference to the following plans, processes, and procedures:

- Incident Response Manual
- Widespread Incident Response Plan
- Silver Centre set-up and management
- Business Function Winter Preparedness Plans

### Objectives

- To exercise the process for declaring an incident and setting up an incident team in line with the Incident Response Manual
- To exercise the Incident Situation Reporting (SitRep) process in line with IMS EP (3) 10
- To mobilise Silver Centres and ensure they are suitably equipped to respond to incidents
- To exercise communication channels across teams whilst responding to high-profile incidents
- To rehearse operational response to concurrent incidents involving severe weather, loss of power and loss of water/waste supplies
- To plan incident team resources including replacement shifts and handovers
- To rehearse WNA response and decision-making process against unexpected challenges
- To rehearse a response involving the current real-life closure of Menai Bridge (due to concerns re the suspension hangers the Bridge is likely closed to vehicular traffic until at least January 2023)
- To simulate a freeze thaw to rehearse a response for multiple supply interruptions / burst mains
- To provide a safe learning environment where colleagues can gain experience in incident management roles
- To identify and integrate lessons to be best prepared for severe weather events during winter

## EXERCISE BACKDROP

A storm system named STARK is moving across Wales bringing with it low temperatures, high winds, heavy snow, and widespread ice. As a result, Public Health Wales has issued Cold Weather Alerts and the Met Office has issued severe weather warnings (Yellow > Amber > Red) covering parts of Wales.

These conditions are causing significant disruption to transport networks, power supplies, telecommunications, and water supplies. A significant number of Water/Waste assets are inaccessible and have lost power.

Gold has stood up and is supported by Silver incident rooms (water and Waste) which have opened across the operating area to manage local impacts.

### **+1 Day (the exercise jumps forward to 10am the next day – Nov 23<sup>rd</sup>)**

A freeze thaw and sudden rise in temperature has caused significant pressure on the network. There is an increase in the number of mains bursts causing loss of water supplies in local communities.

## EXERCISE SCENARIOS & TIMELINE

Item	Realtime (24hr)	Ex Time (24hr)	Delivered to	Message
Weather Warning	18 Nov 10:05	-	All Players	<ul style="list-style-type: none"> <li>Met Office have issued a <b>YELLOW</b> Weather Warning for snow &amp; ice – medium likelihood with low impacts</li> <li>Public Health Wales has issued a Cold Weather Alert LEVEL 2 (Alert and readiness)</li> </ul>
STARTEX	22 Nov 08:00	22 Nov 08:00	All	StartEX email sent to all players and Exercise Control
Weather Warning	08:05	08:05	All Players	<ul style="list-style-type: none"> <li>Met Office have issued an <b>AMBER</b> Severe Weather Warning for heavy snow &amp; widespread ice, indicating a medium likelihood with medium impacts.</li> <li>Snow is forecast to settle until midday tomorrow as a sudden rise in temperature and thaw is expected.</li> <li>Public Health Wales has issued a Cold Weather Alert LEVEL 3 (Severe Weather Action)</li> </ul>
Task 1	08:30	08:30		<ul style="list-style-type: none"> <li>Heavy snow, low temperatures and widespread ice are causing impacts across the operating region.</li> <li>This includes access issues, loss of power, frozen pipes, and bursts</li> </ul>
			N Clean	<ul style="list-style-type: none"> <li>Loss of WTW due to burst on the inlet</li> <li>loss of supply at SRV this is resulting in No Water calls and Low Pressure to Retail</li> </ul>
			SE Clean Production	<ul style="list-style-type: none"> <li>Heavy snow fall is settling in high altitude areas causing power cuts and road closures. The following sites are inaccessible: <ul style="list-style-type: none"> <li>– site has lost power and shutdown</li> <li>– site has lost power</li> <li>– site has lost power</li> </ul> </li> </ul>
			SW Clean	<ul style="list-style-type: none"> <li>Contact Centre receives calls from customers in St Davids, and coastal area around Llanrhian and Trefin complaining of low pressure or no water at all, due to numerous bursts.</li> <li>Increased leakage on both SRVs drops levels quickly.</li> <li>Powerlines are down due to weight of freezing ice, so no power for pump.</li> <li>Field groundworks at Celtic Camping have broken mains supply to site, leaking water</li> <li>Heavy and drifting snow severely limiting road access to the area, crew unable to make much progress to site with larger vehicles towing diggers on trailer.</li> </ul>
			N Waste Treatment	<ul style="list-style-type: none"> <li>Due to the low temperatures and ground movement</li> </ul>
			S Waste Treatment	<ul style="list-style-type: none"> <li>Access is prohibited due to heavy snow.</li> <li>The site has lost power which has resulted in the loss of Phosphate dosing</li> <li>Call Centre has received 2x customer contacts at HR4 8DH complaining about lack of toilet use</li> </ul>
			Comms	<ul style="list-style-type: none"> <li>BBC Wales has been in contact asking for an update about the impact the weather is having on DCWW operations</li> </ul>
Weather Warning	10:05	10:05	All Players	<ul style="list-style-type: none"> <li>Met Office have issued a <b>RED</b> Severe Weather Warning for heavy snow &amp; widespread ice, indicating a high likelihood with medium impacts.</li> <li>Sudden rise in temperature and thaw is expected tomorrow</li> <li>Gold Manager requests resource plans to be prepared for the next few days</li> </ul>

Item	Realtime (24hr)	Ex Time (24hr)	Delivered to	Message
Task 2	10:10	10:10		<ul style="list-style-type: none"> <li>Weather conditions worsen causing further impacts to develop across the operating region.</li> </ul>
			N Clean	<ul style="list-style-type: none"> <li>WPS is offline and we have lost all properties that are supplied from this asset.</li> <li>A generator is required on-site.</li> <li>Due to severe weather the Britannia Bridge is experiencing 5-hour delays. There is a 20 mph speed restriction in place.</li> <li>Retail is reporting 911 properties without water</li> </ul>
			SE Clean	<ul style="list-style-type: none"> <li>Ops have gained access to and attempted to restart the site.</li> <li>Chemical dosing is not adjusting the way it should be.</li> <li>The service water pipe is frozen and no chemical dosing is happening.</li> <li>Generator is delayed on route to site.</li> <li>Freezing temperatures have caused cracks to develop in the raw main and a catastrophic leak resulting in a total loss event.</li> </ul>
			SW Clean	<ul style="list-style-type: none"> <li>Valero refinery reports severely reduced flow of raw water, enquiring if we have an issue on the network.</li> <li>Telemetry shows low level in Greenhill res, specifically in compartment 2.</li> <li>Valero concerned that fire-fighting resilience may be compromised, especially as they are undertaking tank maintenance activities that result in increased risk. Risk is being managed as usual, but in the event of a major incident Valero's own crew and Mid and West Wales FRS rely on raw water stocks for fire-fighting.</li> <li>Heavy weed growth in Res compartment 1 has blocked penstock to compartment 2, severely restricting flow from comp 1 to comp 2 and hence to Valero. Compartment 2 is virtually dry.</li> <li>Power outage results in the pumps feeding reservoir being switched off, pumping ceases. Input to Greenhill has ceased, and compartment 1 is draining via its inlet and the open boundary/bypass valve to Valero.</li> </ul>
			N Waste	<ul style="list-style-type: none"> <li>There are live power cables and clean water mains in proximity to the burst</li> <li>The outfall pumps cannot be run due to the risk of damaging other services</li> <li>SPS has lost power</li> <li>2x customer contacts are reporting internal flooding in Westbourne Avenue Rhyl</li> </ul>
			S Waste	<ul style="list-style-type: none"> <li>Ops and ME&amp;I are on site at The mains are frozen and both SPS are not operational. Spillage is occurring.</li> <li>4x customer contacts have been received due to Hydraulic Overload causing back up in the network from</li> <li>Generator enroute to WWTW is stuck in the snow causing congestion and traffic problems</li> <li>Tankers have also been delayed on route to site due to snow and congestion</li> <li>The Police are advising that all but essential travel on the roads</li> <li>Wallsend and Marden SPS pumps are running but the well level is not dropping</li> <li>NRW asks for an update regarding the situation after hearing about river pollution being reported on social media</li> </ul>
			Comms	<ul style="list-style-type: none"> <li>Dangerous driving conditions across Wales with multiple vehicles getting stuck in snow</li> <li>ITV Wales is asking for an interview with Welsh Water on what the latest situation is</li> </ul>

Item	Realtime (24hr)	Ex Time (24hr)	Delivered to	Message
				<ul style="list-style-type: none"> <li>The Daily Post has called a member of staff in the Dinas office (TBD). They want confirmation that we have lost 5000 properties on the Llyn Peninsula</li> <li>There is a backlash on Social Media indicating that 5000 properties are without water on the Llyn</li> <li>There is a buzz on social media accusing DCWW of polluting the River Lugg with dirty and smelly water. BBC Hereford has picked up on comments on social media regarding the situation. They would like a statement</li> </ul>
			Logistics	<ul style="list-style-type: none"> <li>Tanker drivers have called you to inform you that the roads have come to a standstill due to heavy snow and cars getting stuck</li> <li>Tanker drivers are also stuck in their vehicles</li> </ul>
Task 3	22 Nov 12:00	23 Nov 10:00	Silver Managers	<ul style="list-style-type: none"> <li>Sudden rise in temperature is causing thawing conditions, melting snow and significant no. of bursts across the operating area</li> </ul>
			N Clean	<ul style="list-style-type: none"> <li>2 bursts – One showing high flows in DMA</li> </ul>
			SE Clean	<ul style="list-style-type: none"> <li>WTW site returned back to service overnight. Chemical dosing is now operating as normal.</li> <li>Current demand from SRV assets fed from has increased on average by 50% across the system impacting retention times, with limited ability to increase inlet flows due to WTW shutdown (inlet burst scenario). SRV levels are now all in Low.</li> </ul>
			SW Clean	<ul style="list-style-type: none"> <li>Burst on the trunk main that leaves WTW which enters Haverfordwest town</li> <li>Significant loss of supply throughout the town, and the large volume of water is flooding the road</li> <li>Inlet to WPS has burst due to ground movement caused by the thaw</li> <li>SRV is depleting rapidly due to both bursts</li> <li>Boundary valve at Newbridge that connects the system with the Preseli system cannot be utilised due to water resource issues at WTW</li> <li>Lots of private pipes leaking is causing high flows across all the DMA</li> <li>In particular 'Under the hills' residential caravan park (60 no) is showing high flows on the system</li> </ul>
			N Waste	<ul style="list-style-type: none"> <li>Repair is underway at WWTW outfall pipe and due to be completed</li> <li>It has started to rain risking discharge from SPS and SPS</li> </ul>
			S Waste	<ul style="list-style-type: none"> <li>Smart Hub received an alarm this morning that SPS has no flow</li> <li>Network crew are at site and report a burst on the rising main from SPS</li> </ul>
			Comms	<ul style="list-style-type: none"> <li>There is a negative buzz towards DCWW on social media due to low pressures, frozen pipes, loss of supplies</li> <li>Some tweets are getting a lot of attention about customers leaving their taps running</li> <li>Rhyl Sea Life Centre has contacted the call centre requesting DCWW tankers to fill their site as they have heard the sea, which they extract from, is being polluted</li> <li>Local MPs have been in touch about the pollution situation in North Wales and have requested an update</li> </ul>

Item	Realtime (24hr)	Ex Time (24hr)	Delivered to	Message
ENDEX	15:00	n/a	All	EndEX email sent to all players and Exercise Control Team. Includes instructions for Gold/Silver Rooms to collate comments and be prepared to feedback during the Hot Debrief meeting via Teams.
Hot Debrief	15:05	n/a	All	Feedback from Gold/Silver Rooms to identify: <ol style="list-style-type: none"> <li>1. What went well?</li> <li>2. What did not go well?</li> <li>3. How can we improve?</li> </ol>
Close	15:35	15:35	All	

## TESTING OF INCIDENT PLANS, PROCESSES, PROCEDURES

The exercise gave an opportunity to test a number of plans, processes, and procedures:

- Incident Response Manual
- Incident Situation Reporting
- Widespread Incident Response Plan
- Silver Centre set-up and management
- Business Function Winter Preparedness Plans

The new Gold Silver call format outlined in the Widespread Incident Response Plan was exercised this year. This was designed to reduce the call burden on teams in turn allowing them better uses of resources and focus. This format was circulated in advance as part of the Players Pack and the extract is below:



## DEBRIEF SUMMARY

Exercise debriefs are conducted following every exercise in accordance with the company's post incident review process. This is an important part of the emergency planning process that provides a structured approach to identify lessons to improve emergency plans and supporting processes and procedures.

A hot debrief was conducted immediately post exercise to capture any learning and feedback from those on the Gold call. Feedback forms were also circulated following the exercise in order to obtain further feedback from the day. The debrief uses three headings:

- How can we improve?
- What did not go well?
- What went well?

In summary, the exercise was successful in achieving its aim and objectives and the following positives were received:

- Players feel more prepared should they need to activate their winter plans and more confident about their response arrangements
- Players gained good experience in incident management roles and provided an opportunity for less experienced colleagues to up skill
- Very good engagement and buy-in from players whom demonstrated good teamwork and communicated well in silver and between each other
- Good focus on H&S, PSR customers, comms and wider response
- Prepared Burst Response Plan in place for WwTW worked well and proved beneficial

Lessons identified included:

- Some silver centres need better facilities and equipment to effectively support Silver teams when responding to incidents
- There is a lack of trained loggists within operational teams and knowledge of incident situational reporting best practice
- Better communication is required between Ops and the Wholesale Service Centre

From an exercise planning perspective, the learning identified was:

- Injects are required for all key players and these need to be more detailed and dynamic, for example, by involving Bronze
- Gold needs stretching more, for example, by introducing competing resource allocations, multi-agency demands, or political / regulator interference
- Consider how to address unrealistic deployment assumptions made by players



### Resource Planning before the event

- Planning for the expected cold weather started on Friday 9<sup>th</sup> December with a preparation call with all Senior managers within distribution to highlight the incoming weather risks and to highlight the need to start building enhanced resource lists for the following week based on the predictions of increased distribution input based on weather predictions
- Daily Head of Service led calls were in place from 12<sup>th</sup> December to review Resource availability, Storage position and weather forecasts
- Session held on Wednesday 15<sup>th</sup> December (Fig. 1) with all operational Silver managers for the weekend 16<sup>th</sup>- 18<sup>th</sup> December, to reinforce principles and reporting lines for the weekend
- All silver centres across the three regional areas were planned to open within depots from 8am Saturday morning based on predictions
- Resources lists were available with all standby rotas complete and additional availability in place to support
- Resources were also increased and available from the Water Network Alliance & Leakage Detection
- The business maintains a hard rule that 50% of staff in all operational roles are available during working hours and operates a standby function outside these hours
- There was also a request made to the Dwr Cymru volunteer force on Thursday 16<sup>th</sup> December for people to make them self-available on Sunday and Monday 18/19 of December for bottled water deliveries or tankering if required

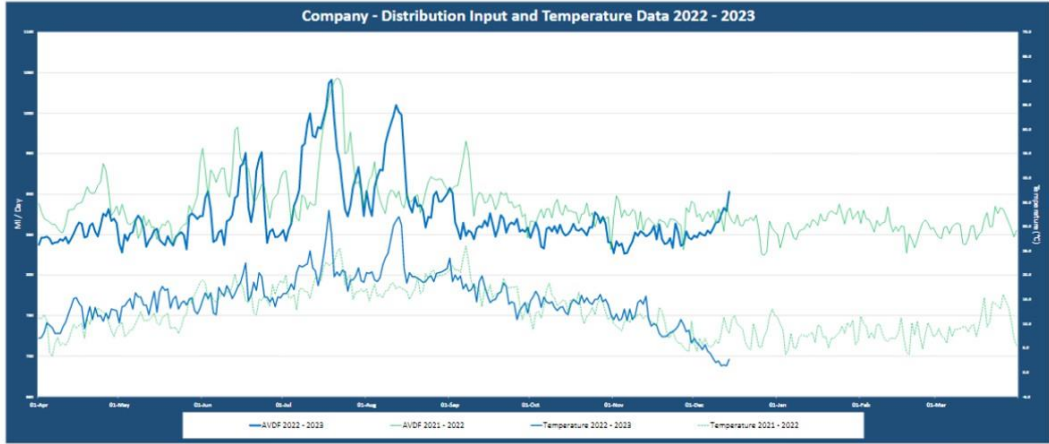


## Cold Weather prep

December 2022

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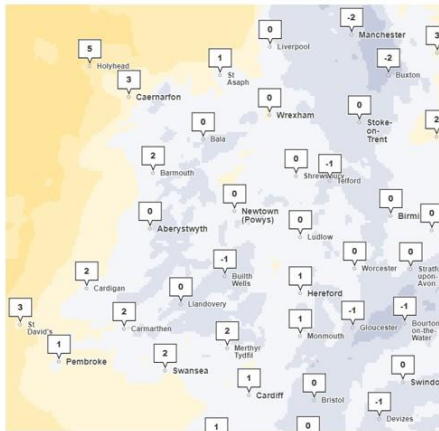
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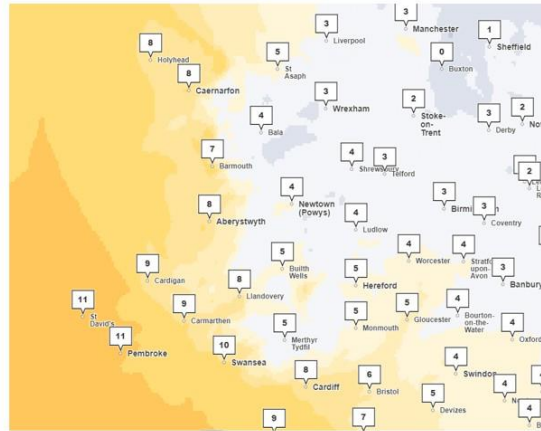
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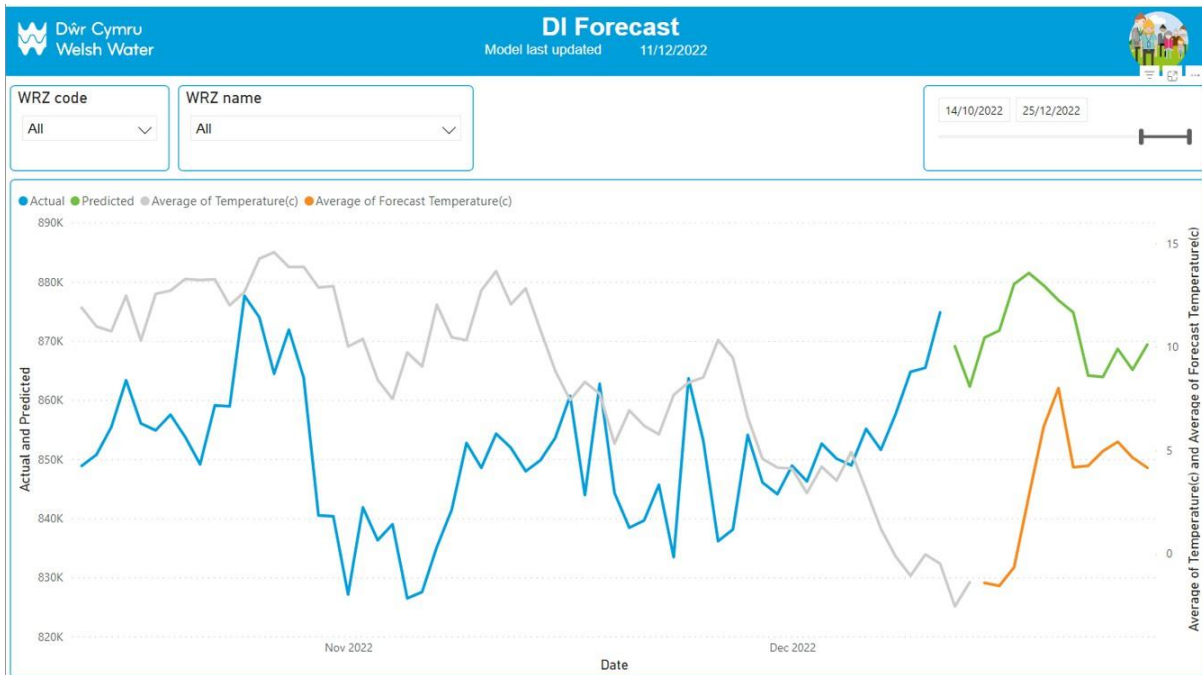
Today



Sunday



[dwrcymru.com](http://dwrcymru.com)



## Weekend Plans

- Sit Reps to be submitted at 0900 & 1500
  - High level impacts and emerging risk
- Silver Call at 0930
  - Review Sit Reps and overnight impact
  - Confirm the plan for the day
- Consolidated Resource plan available
  - Increased availability across most layers
  - WNA & Leakage resource included
- Silver Centres open at 9am on Saturday to manage worst of the impact

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Figure 1: Slide deck from presentation held on Wednesday 15 December 2022

## Resource levels during the event

- As the scale of the event became apparent the business undertook several actions to increase resource levels to support with the operational response
- All levels of operational standby were doubled across the affected areas from 19<sup>th</sup> December through to 25<sup>th</sup> December
  - 12 Further requests made to volunteers on
    - 2x 17<sup>th</sup> December
    - 2x 18<sup>th</sup> December
    - 2x 19<sup>th</sup> December
    - 1x 20<sup>th</sup> December
    - 2x 22<sup>nd</sup> December
    - 3x 23<sup>rd</sup> December
    - 1x 26<sup>th</sup> December
  - This request was sent to all 444 DCWW trained volunteers who have skills to either deliver bottled water, undertake tankering activities or can take customer contacts to support the contact centres. Responses were directed to the geographical areas and allocated to relevant tasks.
- The decision was made to reallocate in excess of 80 staff on less critical activities to assist with the incident
  - Meter Readers (21 staff)
  - Wastewater Networks team (50+ Staff)
  - Water Regulations (11 staff)
- In addition, the Business maintains a list of staff that have undergone Authorisation to tanker training, there are over 100 non operational staff on this list who were called upon to assist in this specialised activity

## Leakage Repairs

Leakage detection and repair activity was significantly increased in the run up to and throughout the weather event. During the month of December 714 Burst Mains were repaired in comparison to the monthly average of 350 (Fig. 2).

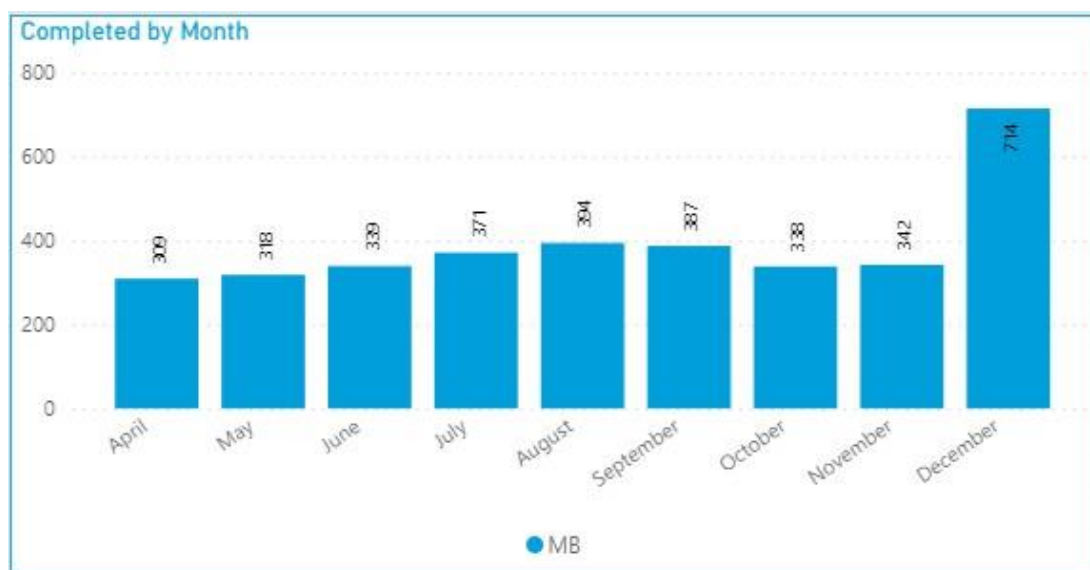


Figure 2: Monthly mains bursts repaired between April 2022 and December 2022.



Linea  
Heol Fortran  
Llaneirwg Caerdydd CF3  
OLT

0800 052 0130  
dwrcymru.com

Julie James MS  
Minister for Climate Change  
Y Senedd  
Cardiff  
CF99 1SN

23 December 2022

Dear Minister

**Freeze–thaw Event (17<sup>th</sup>/18<sup>th</sup> December 2022)**

I wanted to update you on our response to the impact of the recent weather conditions on our service to customers in west and mid Wales and parts of Herefordshire.

By way of background, with a couple of weeks of sub-zero temperatures across Wales earlier in the month, we set up our emergency incident response structure on 12<sup>th</sup> December. This includes our Crisis Management Team (which I chair), our Gold Command at our Control Centre in Cardiff and five Silver Centres across our operating area. We did this in advance of the forecast thaw, which was communicated by the Met. Office for the following weekend. Linked to this we increased our resources and had on standby over 750 people ready to find and fix leaks as the thaw took hold.

The thaw started on Saturday 17<sup>th</sup> with temperatures rapidly increasing from well below zero, (-12°C in some places) to + 8 – 10°C, with these increased temperatures being sustained into this week. The rapid thaw saw a substantial increase in water put into supply. To put this in context, on 12<sup>th</sup> we supplied 874 mega litres a day (mld) rising to 1007 mld on 21<sup>st</sup> December. This increase was linked to burst mains on our network caused by the thaw related ground movement and leaks on customer owned pipes in unoccupied buildings or in exposed locations. Our analysis to date indicates that whilst a significant amount of the increase in water in supply was linked to our assets, there was also a considerable amount resulting from burst consumer plumbing, and customers leaving taps running in an attempt to stop them freezing.

We monitored the developing thaw and undertook operational interventions that meant over 99% of our customers saw no interruption to supply at all. However, there were five mainly rural areas where, the scale of burst pipes on top of consumption was so great that it emptied our local networks of all water in supply. These three areas were:

- Ceredigion – where supply interruption was most acute (now estimated at 7,000 properties) and where our strategic supply network in the area was severely depleted due to the sheer scale of burst mains on our network and the amount of leaks on consumer plumbing. Restoring supply here has been very challenging as our main underground storage reservoirs for treated water effectively ran empty due to our network becoming de-pressurised. It took until Tuesday 20<sup>th</sup> for us to be able to re-pressurise most of the network and this was fully completed by the 21<sup>st</sup>. Refilling the network is a difficult process and takes time, as first of all it can become airlocked preventing water flowing and with no or little water in the mains you cannot find and fix leaks. There are over 2000 kilometres of main in this largely rural area. The majority of customers here either lost supply or suffered an interrupted supply between late

Saturday 17<sup>th</sup> to the afternoon of 21<sup>st</sup> December, with Cardigan continuing to have intermittent supply until today, 23<sup>rd</sup> December.

- Mid Wales – the supply system around Llandrindod Wells, some 12k customers experienced intermittent supply loss between Monday 19<sup>th</sup> and Wednesday 21<sup>st</sup>. The system held up better here than in Ceredigion and did not experience complete depletion.
- Llansteffan, Carmarthenshire – here around 500 properties lost supply between late Saturday 17<sup>th</sup> and the evening of 20<sup>th</sup> December. This was linked to a burst main in the area and subsequent air locking in the system.
- Pencader, Llanfihangel ar Arth Carmarthenshire – around 200 properties between Saturday 17<sup>th</sup> and Friday 23<sup>rd</sup>.
- Dorstone and Welsh Newton – western Herefordshire, approximately 500 properties lost supply here between Monday 19<sup>th</sup> to Wednesday 21<sup>st</sup> due to bursts on the system and through leaks on private supplies.

Our primary focus in this type of large scale thaw incident, is to deploy our resources in a way that prioritises keeping or getting our mains network back to normal operation as quickly as possible, across our operating area. This takes priority as it is the most effective way to prevent prolonged loss of mains supply.

I mention this, as it led us to be slower than we would have liked in terms of deploying alternative supplies especially in Ceredigion. We commenced bottled water deliveries to Priority Services (Cat 1) customers on Sunday 18<sup>th</sup> December and sustained this through to Wednesday 21<sup>st</sup>. However, we were unable to set up general bottled water distribution points at Llandysul and Newcastle Emlyn until Monday 19<sup>th</sup>. We also deployed static tanks in these locations plus at Cardigan and Llansteffan on Tuesday 20<sup>th</sup>, and Aberaeron on the 21<sup>st</sup>. We also established general bottle water distribution points and these two locations on the same day. We also provided bottled water to other smaller locations following discussion with local councillors (e.g. Pencader).

Alongside our incident management structure, we also bolstered our telephone call handling and social media response teams. On 18<sup>th</sup> and 19<sup>th</sup> we saw four times as many calls (some 2.5k), compared to business as usual. We also experienced a significant increase in social media contacts during this period. Due to the dynamic nature of the incident as it unfolded on the ground, we were unable to provide accurate real time information on how long supply interruptions were likely to last and this caused frustration amongst the affected customers. We will undertake a full post incident review and I am certain we will learn lessons in respect of deployment of alternative supplies and customer communication.

During the incident we communicated regularly with local AMs, MPs and Councillors. Due to the scale of the supply interruption in Ceredigion we met and briefed the County Council CEO daily between 19<sup>th</sup> – 22<sup>nd</sup> December. We received great support from them during the incident. We undertook similar dialogue with the senior teams at Carmarthenshire and Powys County Councils.

Whilst we kept the majority of customers in supply across our operating area we fully recognise those in the affected areas experienced considerable disruption. On this basis I will be writing to all customers impacted and we will be paying £70 per day compensation for those who suffered the worst interruptions. These payments will be made automatically to customers early in the new year. During the first week in January, we will publicise a process for business customers to submit claims to us linked to the supply interruption.

There is the likelihood of secondary bursts on our water network following such a large scale thaw event over the coming weeks. We remain prepared for this and are planning to increase our standby resources as we enter the Christmas holiday period. Our incident command structure will monitor the situation and we will escalate our response appropriately should the need arise. Our own people and supply chain teams have worked around the clock to restore supplies and stand ready. Our tanker fleet will remain in full operation over the Christmas period to help us regain strategic water storage over the coming week. We are confident that all customers will be back on mains supply for Christmas. We have mobilised additional

teams to work throughout the Christmas weekend, including Christmas day, to continue to fix issues identified on our network and also to tanker additional water into the area to bolster storage. As a precautionary measure, we are maintaining bottled water at some strategic locations such as Llandysul and Newcastle Emlyn.

We have had regular communication with your officials, Eifiona Williams and Andy Fraser, and are very grateful for their support.

We will conduct a full incident review in the new year and will share the findings with you and your officials.

Finally, I hope you have a quiet and relaxing Christmas - Nadolig Llawen!

Yours sincerely

A handwritten signature in black ink, appearing to read 'Peter Perry', written in a cursive style.

Peter Perry

Chief Executive



Linea  
Fortran Road  
St Mellons  
Cardiff  
CF3 OLT

0800 052 0130  
dwrcymru.com

22 December 2022

Dear Customer,

I would like to apologise sincerely for the recent loss of water supply you have experienced. I appreciate that this has been a major inconvenience and frustration for you, your families and community.

We put plans in place to deal with the impact of the sudden change in the weather conditions last weekend following the prolonged freezing weather conditions, and whilst we managed to maintain water supplies to 99% of customers across our operating area there were customers in some communities who experienced prolonged loss of supply.

We are undertaking a detailed review of the incident to learn from the issues that we encountered, however, it is clear that there are a number of areas where we could and should have done better – especially in terms of the provision of alternative water supplies in rural areas, timely communication with customers on the issues we were facing and local updates on the progress we were making to rectify these issues. I apologise sincerely for these shortcomings.

The number of repairs we had to make on our network, together with the number of burst pipes customers had on their own properties, as well as poor weather conditions and the rural nature of the area, all contributed to the amount of time it took to restore the service. With over 2000km of water mains in the affected area, there have been significant challenges in restoring the network. The extent of the loss of water from our network due to these circumstances equalled the amount of water we put into supply at the height of the summer drought.

Recognising that many customers were without supply for 12 hours or more, many for a number of days, we will pay our household customers £70 per day in compensation and to cover any additional costs that may have been incurred such as the purchase of bottled water. Therefore, any customers who have been without supply for four days will receive £280 in compensation. For context, the average annual household water and sewerage bill is £446. We will look to make these payments automatically to the account holder early in the new year, although it could take a few weeks to process these payments.

Similarly, we will also ensure local businesses are compensated for every day that they were without supply and any verifiable losses they incurred as a result of the supply failures. We will write to all business customers impacted by the supply interruptions to outline the compensation they will receive and also how they will be able to claim for the losses they may have incurred as a result of these service failures, we will do this early in the new year.

We are writing now to make clear to customers that we will be going beyond our regulatory obligations in order to compensate customers, because we recognise we have failed to meet customers' expectations. Lessons have and will be learned from this incident, and once again please accept my sincerest apologies for the issues that you have encountered.

Yours,

A handwritten signature in black ink, appearing to read 'Peter Perry', written in a cursive style.

Peter Perry  
Chief Executive

You can contact us in Welsh or English.

We're not-for-profit.

Every single penny we make goes back into looking after your water and environment.

Dŵr Cymru Cyf. (No. 2366777)

A limited Company registered in Wales:

Linea, Fortran Road, St Mellons, Cardiff, CF3 OLT



22 Rhagfyr 2022

Annwyl Gwsmer,

Hoffwn ymddiheuro o waelod calon am y ffaith eich bod wedi colli eich cyflenwad dŵr yn ddiweddar. Rwy'n gwerthfawrogi bod hyn wedi achosi anghyfleustra a rhwystredigaeth sylweddol i chi, eich teuluoedd a'ch cymunedau.

Rhoesom gynlluniau ar waith i ddelio ag effeithiau'r newid sydyn yn amodau'r tywydd y penwythnos diwethaf yn dilyn y cyfnod estynedig o dywydd oer iawn, ac er i ni lwyddo i gynnal cyflenwadau dŵr 99% o'n cwsmeriaid ar draws ein hardal weithredu, roedd yna gwsmeriaid a gollodd eu cyflenwadau am gyfnod estynedig.

Rydyn ni wrthi'n cyflawni adolygiad manwl o'r hyn a ddigwyddodd er mwyn dysgu o'r nifer fawr o broblemau a gododd, ond mae hi'n amlwg fod yna nifer o feysydd lle gallem, a lle dylem fod wedi gwneud yn well – yn arbennig yn nhermau darparu gwasanaethau dŵr amgen mewn ardaloedd gwledig, cyfathrebu â chwsmeriaid yn brydlon am y problemau oedd yn ein hwynebu, a darparu diweddariadau lleol ar y cynnydd roeddem ni'n ei wneud i ddatrys y problemau. Rwy'n ymddiheuro o waelod calon am y diffygion hyn.

Cyfrannodd nifer y tasgau trwsio y bu angen eu cyflawni ar ein rhwydwaith, ynghyd â nifer y pibellau oedd wedi byrstio ar eiddo'r cwsmeriaid eu hunain, yn ogystal â'r amodau tywydd gwael a natur wledig yr ardal, oll at yr amser a gymerodd y gwaith o adfer gwasanaethau. Gyda dros 2000km o brif bibellau dŵr yn yr ardal o dan sylw, bu sialensiau sylweddol ynghlwm wrth adfer y rhwydwaith. Collwyd yr un cyfaint o ddŵr o'n rhwydwaith oherwydd yr amgylchiadau ag y bu angen ei fwydo i'r cyflenwad ar frig sychder yr haf.

O gydnabod y bu llawer o gwsmeriaid heb gyflenwad dŵr am 12 awr neu ragor, a llawer ohonynt am nifer o ddiwrnodau, byddwn ni'n talu £70 y diwrnod o iawndal i'n cwsmeriaid er mwyn eu digolledu am unrhyw gostau ychwanegol a dynnwyd, er enghraifft wrth brynu dŵr potel. Felly, bydd unrhyw gwsmeriaid sydd wedi bod heb gyflenwad am bedwar diwrnod yn cael £280 o iawndal. I roi hynny yn ei gyd-destun, bil dŵr a charthffosiaeth blyneddol yr aelwyd gyfartalog yw £446. Byddwn ni'n ymdrechu i wneud y taliadau hyn i ddeiliaid y cyfrifon yn awtomatig yn y flwyddyn newydd, ond gallai gymryd ychydig wythnosau i brosesu'r holl daliadau.

Yn yr un modd, byddwn ni'n sicrhau bod busnesau lleol yn cael iawndal am bob diwrnod y buont heb gyflenwadau, a'u digolledu am unrhyw golledion dilys a dynnwyd yn sgil y diffyg cyflenwad. Byddwn ni'n ysgrifennu at yr holl gwsmeriaid busnes sydd wedi cael eu taro gan y problemau hefyd er mwyn amlinellu'r iawndal y byddan nhw'n ei gael, a sut y gallant hawlio am unrhyw golledion a dynnwyd yn sgil y diffyg gwasanaeth. Byddwn ni'n gwneud hynny ar ddechrau'r flwyddyn newydd.

Rydym yn ysgrifennu atoch nawr er mwyn egluro ein bod yn mynd y tu hwnt i'r hyn sy'n ofynnol er mwyn cydnabod ein methiant i fodloni disgwyliadau ein cwsmeriaid. Dysgwyd gwersi o'r digwyddiad hwn, ac mae rhagor o ddysgu o'n blaenau, ac eto, hoffwn ymddiheuro o waelod calon am y problemau sydd wedi dod i'ch rhan.

Yn gywir,



Peter Perry  
Prif Weithredwr

Cysylltwch a ni yn Gymraeg neu'n Saesneg.

Rydym yn gwmni nid-er-elw.

Mae pob ceiniog a wnawn yn mynd i ofalu am eich dŵr a'ch amgylchedd.

Dŵr Cymru Cyf. (Rhif 2366777)

Cwmni cyfyngedig wedi'i gofrestru yng Nghymru:  
Linea, Heol Fortran, Llaneirwg, Caerdydd, CF3 OLT



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Blwch Post 690  
Caerdydd  
CF3 5WL

[dwrcymru.com](http://dwrcymru.com)

<CustomerName>  
<BillingAddress1>  
<BillingAddress2>  
<BillingPostCode>

Our Ref: <SCHEDULE\_REFERENCE>

Dear Customer

I want to apologise for the prolonged problems with the water supply in your area in December. Such disruption and inconvenience is rare, and despite the tireless hard work of our teams to restore supplies fully as quickly as possible, on this occasion we know we fell short of our customers' expectations.

I appreciate the serious impact that the loss of water or low pressure will have had on you, your family, and the local communities. To recognise this, we will be paying every household customer who was off supply for more than 12 hours £35 and a further £35 for every subsequent 12 hour period the water was unavailable for you. We will make the payment automatically to your bank account (the one you pay your water bill from) over the coming days.

#### **Why did it happen?**

The prolonged sub-zero temperatures running up to the weekend of 18/19 December resulted in the ground across large areas of our operating area freezing hard. The subsequent rapid thaw, which happened far quicker than anticipated, resulted in significant ground movement bursting many of our pipes.

Ahead of the change in the weather, we put plans in place to deal with the impact of the sudden increase in temperature. Whilst we managed to maintain water supplies to over 99% of our customers, some communities in Ceredigion, Carmarthenshire and Herefordshire experienced prolonged loss of supply. Fixing the problems in a highly rural area was very challenging. Compared with the same period last year, we encountered a 300% increase in reported burst main pipes. We identified and fixed over 2,100 leaks across our operating area which is 50% more than the same period last year, a significant proportion of which were on customer properties. We also distributed over 700,000 litres of bottled water.

However, there are a number of areas where we could and should have done better – especially in terms of the provision of alternative water supplies, timely communication with customers on the issues and local updates on the progress we were making to rectify these issues. Our review into the incident is ongoing, but we will look to learn from the situation to ensure improvements are made ahead of any future incidents. I hope that this payment goes some way to show that we take events like this very seriously as a company.

Yours sincerely

Peter Perry  
Chief Executive Officer

We're not-for-profit. Every single penny we make goes back into looking after your water and environment. You can contact us in Welsh or English.

Rydym yn gwmni nid-er-elw. Mae pob ceiniog a wnawn yn mynd i ofalu am eich dŵr a'ch amgylchedd. Cysylltwch a ni yn Gymraeg neu'n Saesneg.

Dŵr Cymru Cyf (2366777)  
A limited Company registered in Wales  
Cwmni cyfyngedig wedi'i gofrestru yng Nghymru:  
Pentwyn Road, Nelson, Treharris CF46 6LY



# DCWW Response to Freeze / Thaw 2022

## Post Incident Review (PIR)

Feb 2023



## Contents

1. Introduction
2. PIR Purpose
3. PIR Approach
  - 3.1 PIR – Dŵr Cymru Welsh Water
  - 3.2 PIR – Local Resilience Forums
    - 3.2.1 *Dyfed Powys LRF*
    - 3.2.2 *Herefordshire*
    - 3.2.3 *Monmouthshire*
    - 3.2.4 *Powys Council*
4. DCWW Hot Debriefs
5. Internal PIR Discussion Agenda
6. DCWW - What Went Well
7. Key Outputs
  - 7.1 Dŵr Cymru Welsh Water
  - 7.2 LRF Post Incident Reviews
    - 7.2.1 *Dyfed Powys LRF*
    - 7.2.2 *Debriefs with Local Councils*
8. Recommendations
  - 8.1 Recommendations
  - 8.2 Specific Actions
9. Going Forward
  - 9.1 Recommendations
  - 9.2 Specific Actions

## 1. Introduction

This Report outlines the learning identified following the Freeze Thaw incident experienced by Dŵr Cymru Welsh Water (DCWW) during December 2022

The Post Incident Review was completed on the 27 January 2023 and included representation from all teams involved in the incident. In addition individual debrief sessions were held with stakeholders including Dyfed Powys Local Resilience Forum (LRF), Herefordshire, Monmouthshire and Powys Councils

From the discussion outputs and the LRF debriefs agreed Actions were split between high level Recommendations which would be taken forward through a working group and specific actions which would be completed by individual teams within DCWW.

For each recommendation, a scope of the project outlining work activities and timescales will be provided to our Water Services and Operational Services Director by the end of March for review and sign off. The specific actions will be added to our internal Incident Action Tracker and progress tracked through the Incident Response Group. This Group meets monthly with escalation in place up to Director level to ensure actions are completed within the agreed timeframes.

## 2. PIR Purpose

Post Incident Reviews (PIRs) are an important element of the Incident Management lifecycle as they allow for a structured approach to capture learning lessons, improve plans, procedures and assets whilst identifying measures to prevent a reoccurrence.

Post Incident Reviews (PIR) are a requirement under the Security & Emergency Measures (Water & Sewerage Undertakers) Direction (SEMD) 2022 and as such is a contributing element of the annual SEMD audit to Welsh Government.

## 3. PIR Approach

### 3.1 [PIR – Dŵr Cymru Welsh Water](#)

The Post Incident Review was completed on the 27 January 2023 at an off-site location in Cardiff. Attendance included all teams involved in the response including:

- |                      |                    |                          |
|----------------------|--------------------|--------------------------|
| ▪ Water Distribution | ▪ Water Production | ▪ Water Engineering      |
| ▪ Retail             | ▪ Communications   | ▪ Emergency Planning     |
| ▪ Water Logistics    | ▪ Water Quality    | ▪ Water Network Alliance |
| ▪ Capital Delivery   | ▪ Gold Managers*   | ▪ Silver Managers*       |

**\*as defined within our Incident Response Manual (IRM)**

Also in attendance was our:

- Managing Director of Water, Asset Planning and Capital Delivery (Chair)
- Water Services Director
- Operational Services Director

The review was chaired by our Head of Emergency Planning & Security

## 3.2 [PIR – Local Resilience Forums](#)

### 3.2.1 [Dyfed Powys LRF](#)

Following the closure of the Tactical Coordination Group (TCG), as the Chair of the TCG we requested a structured debrief was undertaken focusing on a number of key response areas:

- a) Communication from DCWW (Stakeholders and customers) – what went well/what didn't go well?
- b) Alternative water provision and bottled water collection points – what went well/what didn't go well?
- c) DPLRF to DCWW interactions – what went well/what didn't go well?
- d) Proactive customer messaging – what went well/what didn't go well?
- e) Advice between agencies – what went well/what didn't go well?
- f) Recommendations for future incidents?

The debrief was conducted virtually on the 20 January 2023 and chaired by Dyfed Powys Police with representation from multi agency partners who were involved in the TCG.

### 3.2.2 [Herefordshire](#)

A debrief was completed with Herefordshire Council on the 6 January 2023.

### 3.2.3 [Monmouthshire](#)

A meeting was held with the Emergency Planning team at Monmouthshire Council on the 11 January 2023. This was to specifically discuss the response to the burst main to Trellech service reservoir

### 3.2.4 [Powys Council](#)

Whilst Powys Council was represented at the Dyfed Powys TCG (and debrief), following the debrief we met with Powys Council on the 20 February 2023 to specifically discuss the issues experienced in Powys. This was following some feedback they had received from local Councillors in their area

## 4. DCWW Hot Debriefs

As part of our PIR process, following the closure of Gold, all teams involved undertook a Hot Debrief to capture immediate local learning and to feed into the high-level actions that would be agreed at the formal PIR

## 5. Internal PIR Discussion Agenda

The PIR was structured against the timeline of the incident and to cover all aspects of the response.

### Planning

- Did we stand up early enough?
- Could we have been better equipped to respond?

### Command Structure

- Command structure and effectiveness
- Communication
- Are we missing any incident roles for the IRM

### Operational Response

- Resources
- Targeting of areas
- Leakage
- Network modelling / data accessibility

### Communications

- External Stakeholders / Customers
- Websites and Social Media
- Local Resilience Forums

### Customer

- PSR Data
- Understanding affected areas compared to customer contacts
- Improvements to PSR communications / prioritisation
- Capturing of vulnerable sites / establishments (e.g. carehomes)

### Alternative Water

- Location and number of bottled water stations
- Stocks of bottled water
- Bottled Water suppliers
- Staffing stations and alternative water responsibilities
- Arlington Tanks
- Tankering Fleet

### Water Quality

- Sampling response
- DWI Reportin

## 6. DCWW - What Went Well

Whilst identifying learning is important to improve our future response, it is also important that reflect on what we achieved during the incident.

- Commitment of colleagues across the business to be involved and support customers over the Xmas period
- Learning from previous incidents provided a better level of response
- The preparation through the week leading up to the predicted weather change allowed us to be in a position to respond on the 17 December
- Highlighted the importance of planning and exercising winter plans / arrangements in advance of an incident
- The length of the incident meant that new Silver Managers / Incident teams were exposed to learning and shared knowledge with more experienced colleagues
- Loggists within the Incident team helped with structuring the calls and circulation of SitReps
- No Health & Safety incidents across all teams involved in the response
- Resilience of treatment works to maintain water demand across the supply area
- Support from Transport teams in loading / unloading curtainsiders / Hi Abs for alternative water deliveries
- Positive feedback from Dyfed Powys Local Resilience Forum and Herefordshire Council
- Production / Distribution interactions across the incident to maintain demand
- The comments / feedback received by the majority of customers
- Meeting our SEMD thresholds with regards availability of alternative supplies across 24 hrs, 3 days and 5 days
- The relationships we have with our bottled water suppliers was evident across this incident
- Obtaining and making available circa 1M/l of alternative water during the response



## 7. Key Outputs

### 7.1 [Dŵr Cymru Welsh Water](#)

The PIR was structured so all colleagues had the opportunity to provide feedback and opinions in an open and safe environment without criticism. This allowed a positive level of interaction within the room which provided a number of key outputs around the Discussion Agenda.

Discussion Topic	Key Outputs from Discussions
<b>Planning</b>	<ul style="list-style-type: none"> <li>▪ Discussions are needed with the National Farmers Union (NFU) to understand expectations of the farming community during a widespread incident but also on how they can support us as part of the response.</li> <li>▪ Whilst we had a dedicated winter Communications campaign should we change the messaging during a prolonged freeze to promoting our main challenges if thaw is predicted.</li> </ul>
<b>Command Structure</b>	<ul style="list-style-type: none"> <li>▪ We need to ensure SitReps are clear, concise and contain the correct level of information to raise the areas of support from Silver to Gold.</li> <li>▪ The level of information being seen across incident teams and Command rooms (Gold and Silver) is not consistent. We need one version of the truth across all incident teams to ensure we are coordinating our response in the right areas.</li> <li>▪ This incident involved the full breadth of our incident teams and therefore allowed a number of colleagues to gain valuable experience in incident response and incident management. We need to continue to upskill colleagues against incident roles.</li> </ul>
<b>Operational Response</b>	<ul style="list-style-type: none"> <li>▪ Whilst we undertook pro-active dis-connections to reduce demand through customer side leakage on reflection, given the scale of customer side leakage we should have conducted this activity sooner.</li> <li>▪ We have hydraulic models of however we need to review the outputs of these models to ensure it identifies how the network behaves following this incident. This will assist in investment cases for AMP7 and AMP8.</li> <li>▪ We need to incorporate the learning from this incident into our Leakage Strategy.</li> <li>▪ Given the time of year we had good support from our Incident Support (Volunteers) teams however we need to review the feedback from these colleagues to continue to improve the process.</li> <li>▪ Given the challenges with airlocks in the system, we need to undertake a review of our current maintenance programme and DOMS strategy to ensure we understand any problematic areas and make necessary improvements.</li> <li>▪ We need to fully understand the root cause analysis on the Reservoirs in West Wales on how they were lost, this will be identified through the improvements to the hydraulic models.</li> </ul>

<p><b>Communications</b></p>	<ul style="list-style-type: none"> <li>▪ We have had some feedback from customers and stakeholders with regards our 'In Your Area' website tool and how this could be improved to give a better level of information in an incident. This includes increasing the viewing area to assisted Local Authorities and a RAG status to provide information to customers / stakeholders (e.g. if Red then we know there is an issue and we are responding, Amber shows we understand the issue and working on the fix).</li> <li>▪ We need to ensure we manage customer expectations with regard return of their supply. This was highlighted in Trellech given we anticipated the system to be restored on the 24 December.</li> <li>▪ We created a new Incident Communications email for the incident response, and we will need to understand how this will be used for future incidents.</li> </ul>
<p><b>Customer</b></p>	<ul style="list-style-type: none"> <li>▪ The current wording across all our PSR customer literature gives the impression that all PSR customers will receive bottled water within 4 hours of an incident. Excluding our P1 customers, we need to review this position to see if we are meeting our own expectations and that of customers during a large incident.</li> <li>▪ We need to make better use of technology and stakeholder relationships with regard the capturing of vulnerable sites and how we can make this available to our incident teams.</li> </ul>
<p><b>Alternative Water</b></p>	<ul style="list-style-type: none"> <li>▪ Whilst our alternative water response delivered over 1m litres across the incident we need to improve the scalability of our response from the outset, especially in rural locations.</li> <li>▪ This incident highlighted the need to identify locations / sites for alternative water stations in advance. Whilst this work is already in progress we have already highlighted the importance of this work to the LRFs as part of our debriefs.</li> <li>▪ This was the first time we had deployed Arlington tanks and whilst they provided a useful addition the current constraints with regard sampling and customer messaging did hinder the response. We need to therefore review how we utilise these assets in future responses.</li> <li>▪ Whilst we provided appropriate customer advice alongside the water taken from the Arlington Tanks, this was our generic Boil Water Notice. This is more detailed and provides information which differs in to the messaging required in this instance. We need to create a specific customer advice leaflet for when we deploy Arlington Tanks to reflect how the water should be used.</li> <li>▪ We utilised two additional bottled water suppliers during this incident, and we will need to agree contracts with these suppliers to increase our alternative water resilience.</li> <li>▪ The LRF Water Distribution Plans outline a more wider response from LRF partners than is actually required. We need to update these plans to reflect current expectations and level of support.</li> </ul>
<p><b>Water Quality</b></p>	<ul style="list-style-type: none"> <li>▪ We had to create bespoke SitReps to report daily to DWI and other stakeholders. We should look to produce templates of these in advance so we understand the level of information we need to provide during the incident.</li> </ul>

## 8. Recommendations

From the outputs outlined in Section 7.1 and the LRF debriefs in Section 7.2, the agreed Actions were split between high level Recommendations which would be taken forward through a working group and specific actions which would be completed by individual teams within DCWW.

### 8.1 Recommendations

Unless otherwise stated all Recommendations have a completion date of the end of March 2023. This is for the Owner to establish the working group, hold the initial meeting and agree a more detailed scope of work with individual timescales.

Recommendation	Owner	Completion Date
Set up a Working Group to incorporate the colleague feedback into our Incident Support (volunteers) process	Emergency Planning	March 2023
Incorporate the incident learning into our Alternative Water response including type of alternative supply, resource requirements and team structure	EP / Water Distribution	March 2023
Review customer feedback and internal challenges to identify improvements in responding to PSR customers and the management of expectations	Retail	March 2023
Customer Communications – explore the improvements we can make to ‘In Your Area’ so that it provides more real time information and increases the scale of the information to aid stakeholder partners	Communications / Retail	April 2023
Complete a review of our hydraulic models and outline an Action Plan to improve the level of understanding within the areas impacted so investment can be identified to improve network capacity	Water Assets / Distribution	February 2023
Agree the level / type of information and construct appropriate dashboards which can be made available within our Gold and Silver command rooms during incidents	Operational Services	March 2023
Review and undertake a gap analysis of the current Distribution / Production maintenance programme	Distribution / Water Assets	March 2023
Improve visibility, data capture and level of information around vulnerable sites	Retail / Emergency Planning	March 2023
Outline suitable timeframes and take ownership of the Actions agreed following the debriefs from the Local Resilience Forums	Emergency Planning	February 2023
Incorporate the learning from this incident into our Leakage Strategy	Water Engineering	March 2023

## 8.2 [Specific Actions](#)

These actions will be owned and completed by individual teams and will improve elements of our response during future incidents.

Action	Owner	Completion Date
Engage with the National Farmers Union (NFU) around support during incidents and alternative water offerings	EP / Distribution	Responded to a NFU letter asking for a meeting to discuss
Create a specific advice leaflet for issuing to customers taking water from an Arlington Tank	Emergency Planning	February 2023
Agree bottled water contracts with Princes Gate and Decantae to provide further resilience	EP/ Procurement	March 2023
Identify how the new Incident Communications email will be used for future incidents	Comms / EP	March 2023
Explore options to increase the timeline of identifying pre-agreed suitable locations for alternative water deployment	Emergency Planning	February 2023
Produce SitRep templates which can be used to where increased frequency of updates are required to stakeholders / regulators	Emergency Planning / Water Quality / Communications	April 2023
Review Winter communication campaigns to factor in learning from the incident and any specific messages we want to include for winter 2023	Communications	April 2023

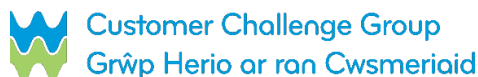
## 9. [Going Forward](#)

### 9.1 [Recommendations](#)

For each recommendation, a scope of the project outlining work activities and timescales will be provided to our Water Services and Operational Services Director by the end of March for review and sign off.

### 9.2 [Specific Actions](#)

The specific actions will be added to our internal Incident Action Tracker and progress tracked through the Incident Response Group. This Group meets monthly with escalation in place up to Director level to ensure actions are completed within the agreed timeframes



*Providing independent challenge, scrutiny and advice  
Darparu craffu, herio a chyngor annibynnol*

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## **Dŵr Cymru's Response to the Freeze-Thaw Event December 2022**

As chair of the Dŵr Cymru Independent Challenge Group I am pleased to have been asked by Peter Perry CEO Dŵr Cymru to contribute to an independent review of the Freeze - Thaw experience.

The review supported by the Independent Challenge Group (ICG) will focus on the customer perspective, in particular Dŵr Cymru's:

- preparation to support customers in advance of the event.
- communication with customers before and during the event
- effectiveness in providing alternative supplies.
- fulfilling of obligations to vulnerable customers and those on the priority services register.
- arrangements for compensation for domestic and business customers.

Dŵr Cymru have also commissioned Jacobs Engineering to undertake an independent review which will focus on the operating performance of the company through the event and will produce an independent report for the end of March 2023.

The ICG report will be based on interviews with external stakeholders impacted by the Freeze- Thaw and will also be completed by the end of March.

An initial review of the evidence provided by the company and early feedback indicates that:

1. The weather conditions over the period were exceptional as measured against national weather data, in particular the sudden rise in temperature following a long cold spell.
2. A significant number of customers, over 20000 households, were potentially affected at some point through the event. There was significant interruption to water supply for over 15000 customers, with over 10000 losing water for 2 days or over and 51 for 7 days.
3. The company had undertaken preparations for winter and adopted learning from previous events, but the nature of this event put extreme stress on systems, which were not always able to cope with the challenge.
4. Up to 60% of the water loss leading to supply issues has been attributed to customer side leakage, with causes related to the rural nature of the area.
5. The support for priority service customers was provided, with early action being taken to contact those in potential risk in advance of the event.
6. Many of the customers most affected were first language Welsh speakers and the company was able to provide advice and support in Welsh.
7. The rural nature of the area and distances involved resulted in problems over the distribution of bottled water supplies.

## Appendix 7: Independent Challenge Group (ICG) Initial Review

8. While communication systems were in place there were significant gaps in providing information to the level that customers wanted and, in some cases, giving inaccurate reports on when supply would be restored.
9. The engagement with local stakeholders, in particular local councillors, was critical, sometimes providing more accurate on the ground information than was available through company systems.
10. Customers were in general understanding of the challenges faced by the company, with a number of positive comments being registered on the web site. The Consumer Council for Water have noted that “We saw no increase in contacts resultant from freeze/thaw and felt that the company’s communication with us was of a good standard”
11. The early apology along with comprehensive compensation has been well received by households and businesses.

These points will be further explored though in-depth interviews with key community representatives from the affected area. A final report will be discussed with the ICG before submission to the company by the end of March. This report will then be made available on the ICG website page.

Peter Davies  
Chair Independent Challenge Group  
22/02/23