South West Water

2.1 Statement of Reasons

November 2022

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1 BACKGROUND

South West Water is applying for a drought permit under section 79A of the Water Resources Act 1991 (**"WRA 1991"**) to make temporary amendments to abstraction licence 15/48/018/G/118/R01 as issued on 30 January 2018 (**"the Licence"**) relating to abstraction from Park Lake, for the purposes of replenishing the storage levels at Colliford Reservoir

1.1 Executive Summary

The permit offers support across the entire Colliford Water Resource Zone ("**WRZ"**) in response to the Exceptional Shortage of Rainfall (**"ESOR"**) from November 2021 to October 2022, which presents an anticipated future risk to the security of supply from December 2022 through to September 2023.

In accordance with paragraph 1.3.5 of the Drought Permit Guidance, South West Water is applying for this drought permit to reduce the risk of drought permits or orders being required in Spring/Summer 2023, to assist the recovery of water supply resources which have been excessively depleted because of drought and to assist the maintenance of water supply in drought affected areas.

Drought Permit Application Documents

This document is part of a suite of documents as set out in Table 1 which form the application for the drought permit, and which are based on the requirements set out in Appendix E of the Drought Permit Guidance (Environment Agency, 2021).

Table 1 Document structure for drought permit application

Documents: Drought Permit Proposals		
1	1.1 1.2 1.3 Appendix 1 Appendix 2	Description of Proposals Draft Permit Drinking Water Services Report 2022 – Operations Supporting Evidence Park Lake Abstraction Licence National Security Notice
2	2.1 2.2	Statement of Reasons Case for Exceptional Shortage of Rain (ESoR)
3	3	Park Lake Drought Permit Environmental Impact Review
4	4 Appendix 1 Appendix 2	Evidence the Company has followed its Drought Plan Enhanced Media Campaign Leakage and pressure management
5	5	Actions taken to reduce demand and conserve supplies in line with Drought Plan
6	6 Appendix 1 Appendix 2	Consultation Process Formal Notice Email to Stakeholders

1.2 Objectives of this document

This document sets out the events and conditions that have led to the need for the drought permit.

This document includes:

i. A description of the supply region;
ii. A description of how the drought has progressed;
iii. A description of demand and supply-demand balance of the zone;
iv. A summary of the drought actions taken to date;
v. The forecasted effect on the water supply;
vi. The case for the drought permit.

The detailed exceptional shortage of rain ("**ESOR**") case is set out in **Document 2.2**.

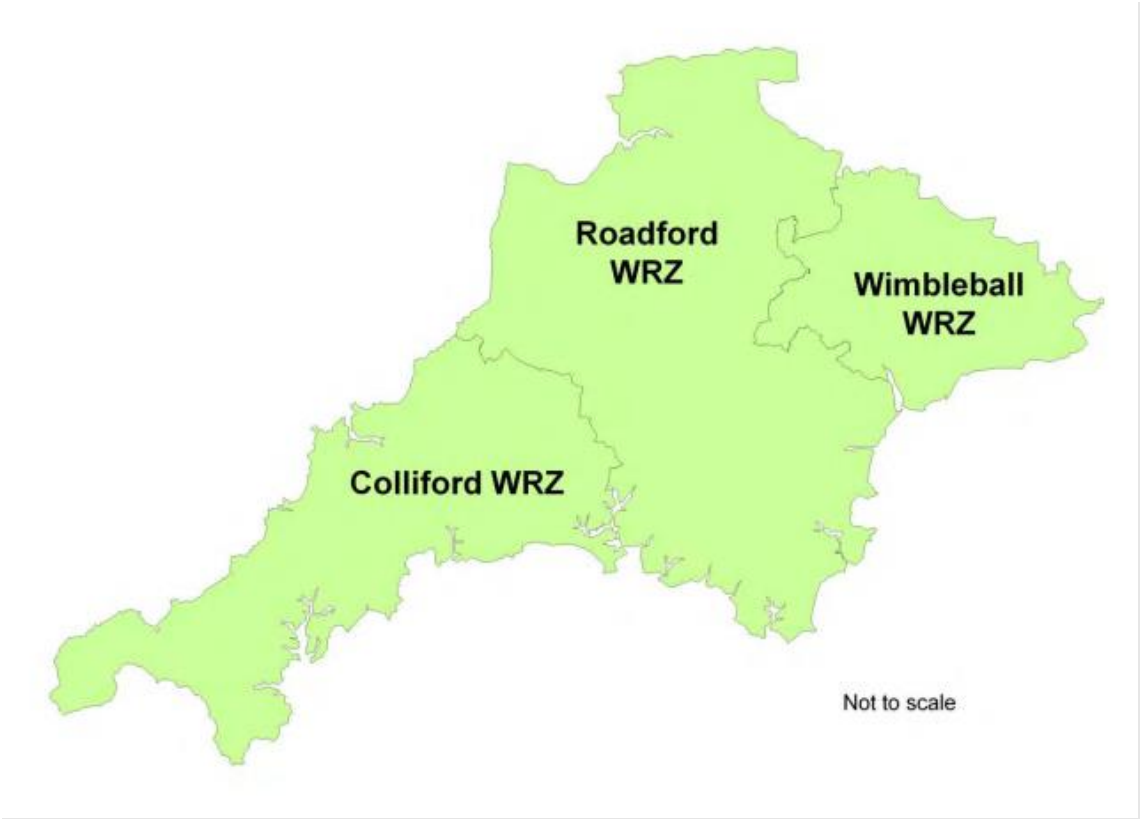
2 SUMMARY OF THE SUPPLY AREA

2.1 Our South Western Supply Area

South West Water is the water and wastewater service provider for a population of c. 1.8 million in Cornwall, Devon, and parts of Somerset and Dorset. Since 2016 it has also been providing water services in the Bournemouth Water region to a population of c. 0.5 million.

The drought permit application relates to South West Water's Western supply area, which is made up of three WRZs (see Figure 1). Each WRZ is centred around a strategic reservoir which shares the name of the WRZ: Colliford, Roadford and Wimbleball. Colliford Reservoir is within the Colliford WRZ.

Figure 1 - WRZs in the South West Water Supply area



2.2 Colliford Water Resource Zone

The drought permit application is in relation to abstraction from Park Lake which is situated in the Colliford WRZ.

The Colliford WRZ encompasses almost all of Cornwall, with the exception of the North East of the County. The Colliford WRZ serves a population of around 567,000 people and approximately 276,000 domestic and commercial properties within the zone.

Colliford Reservoir, conjunctively with local reservoirs, two disused former china clay pits (one of which is Park Lake) and river intakes, form the Colliford WRZ. These sources are supplemented by a bulk transfer from Roadford WRZ of up c.3 Mld.

The supply system in Colliford WRZ is reliant upon the strategic Colliford Reservoir. A number of supply sub-systems are supported by Colliford Reservoir Restormel WTW, especially during periods of peak demand, via the Cornwall Spine Main.

It is vital to retain some water within the smaller reservoirs in the supply sub-systems to maintain supply to local isolated customers (not backed up by Colliford Reservoir or Restormel WTW). These 'isolated' customers can be broken approximately into the following property numbers:

- Drift 12,580
- Argal / College (which can be used conjunctively) 13,027
- Stithians 10,091 (which can be used conjunctively for treatment via Wendron)
- Crowdy 6,663

Colliford and Stithians can be used conjunctively, and there is also a link between Stithians and Wendron WTW because when there is not enough river flow to supply treatment at Wendron, the water is released from Stithians into the river, to then be abstracted for treatment there.

Colliford Reservoir is a multi-season reservoir and hence is more susceptible to longer periods of drought. Colliford has a large net capacity but does not refill every year, and in the past has taken up to 5 years or more to refill (e.g., Colliford Reservoir 2001 – 2008). The storage of Colliford Reservoir can be supplemented by pumped transfers from Restormel WTW and Stannon Lake. This drought permit seeks to increase abstraction from Park Lake to enable further supplementation of Colliford Reservoir.

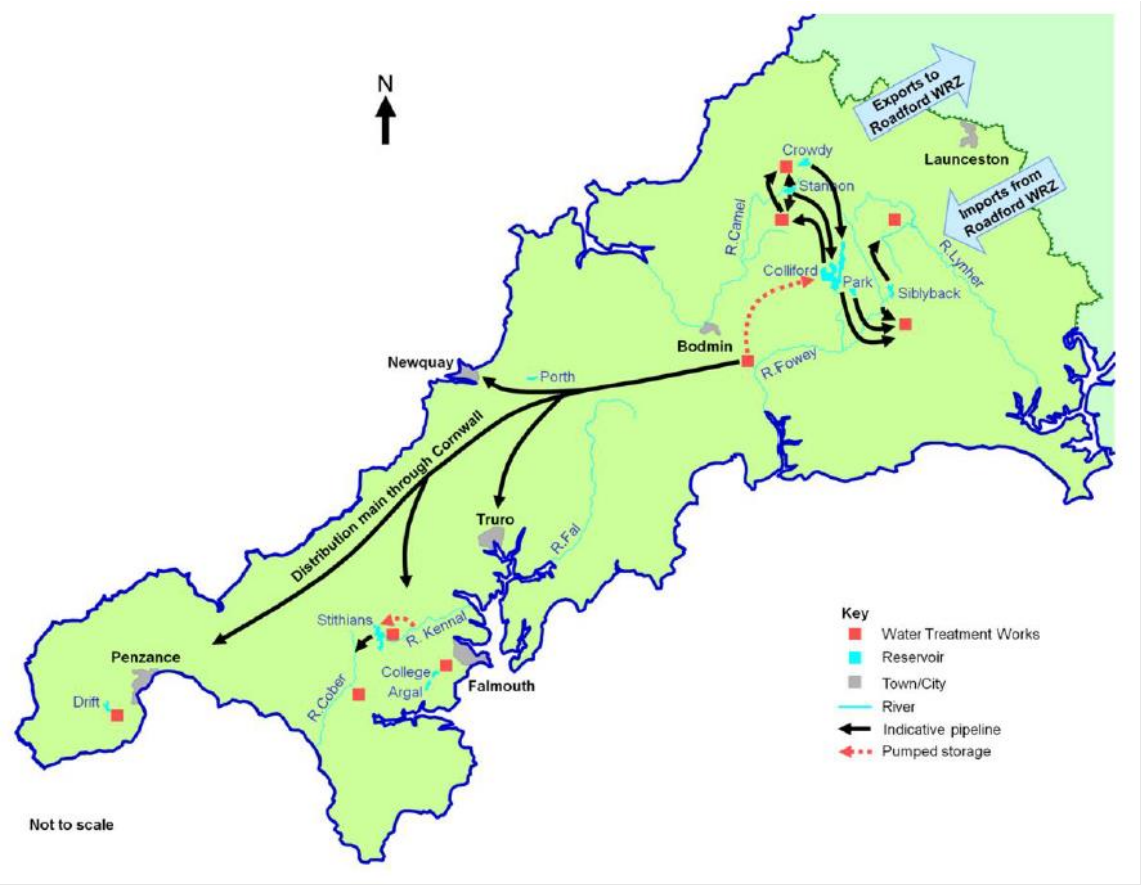
Water resources in the Colliford WRZ consist of seven impounding reservoirs, seven river intakes and two groundwater fed disused china clay pits. Our total available reservoir capacity in the Colliford WRZ is 43,482 Ml, with around 65% of that being from Colliford Reservoir. Park Lake holds a net capacity of 2,183Ml.

Permanently installed pumps at Park Lake ordinarily pump water towards St Cleer WTW. Under usual circumstances the full licence of 8Mld is required for public water supply at St Cleer WTW.

Increasing the licence for abstraction from Park Lake, from 8Mld to 14Mld, will provide:

- an additional 2Mld to support St Cleer, reducing the need to abstract from Colliford to St Cleer
- an additional 4Mld for the winter recharge of Colliford Reservoir.

Figure 2 - Key components of Colliford WRZ



Colliford Reservoir supplies 185,099 properties within the WRZ. (See ***Document 1.1 Description of the Proposals (Section 2)*** for further detail). The Colliford WRZ supplies approximately 276,000 domestic and commercial properties in total within the zone.

Details of the current abstraction licence at the Park Lake can be found in ***Document 1.1 Description of the Proposals (Appendix 1)***.

2.3 Supply of daily water demand

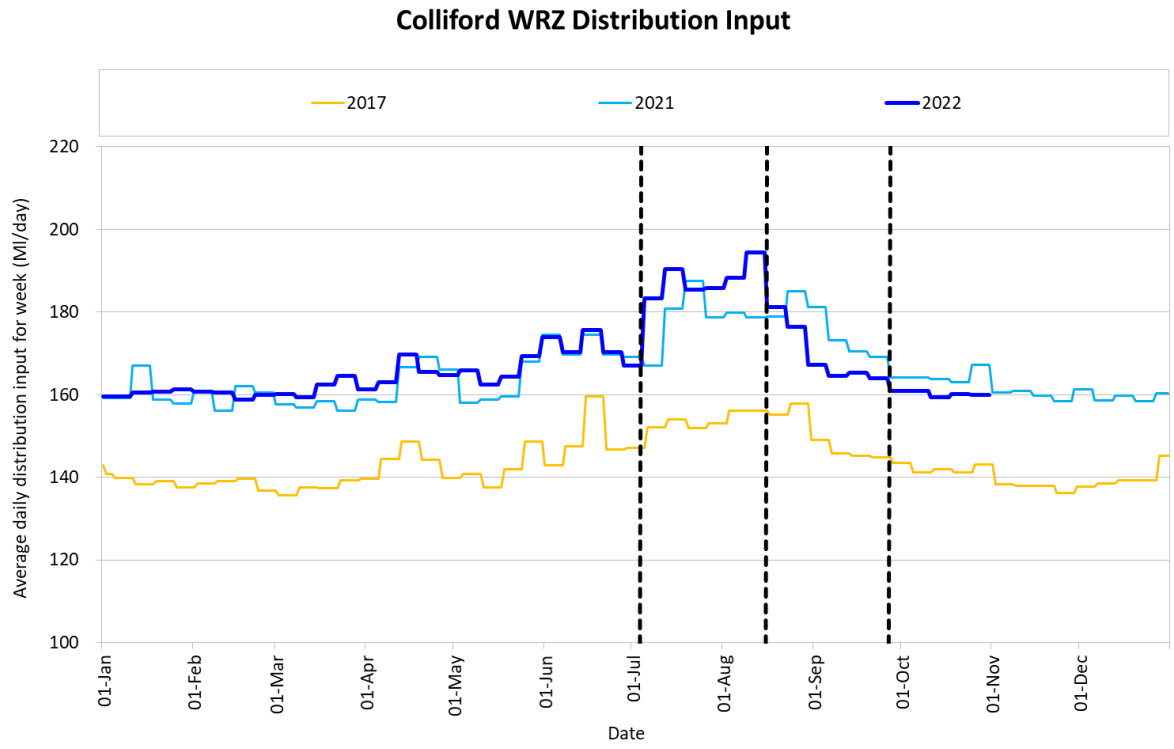
In 2021/22 South West Water supplied an average of 166.35 Mld of water in the Colliford WRZ. The daily demand at St Cleer WTW, served by Park Lake is ordinarily 25Mld.

We have seen a significant change in the demand pattern for Cornwall since the COVID pandemic; an increase in second home residency and increased tourism.

During summer 2022, South West Water took measures to reduce consumption because of the reducing storage levels in the Colliford Reservoir. These measures included enhanced leakage activities and support, an enhanced customer and stakeholder communications campaign and reduction in operational water consumption. These activities commenced, in accordance with our Drought Plan, as a precursor to the implementation of TUBs on 23 August 2022. Whilst it is difficult to precisely prescribe volumetric benefit to individual activities, we observed a c.10Mld reduction between July and August 2022 peaks.

The Colliford system is conjunctive; as local reservoirs decline because of the exceptionally dry weather in 2022 it has been necessary to transfer some demand to this strategic reservoir, as per design philosophy. This has been necessary to maintain public water supply across all areas within the Colliford WRZ during the summer and early autumn 2022.

Figure 3 – Colliford WRZ Distribution Input



Throughout 2022 demand has broadly mirrored that of 2021 and remains elevated from the base year of 2017 (the year on which our Water Resource Management Plan and business plan are based); this relates to changing home use and elevated tourism patterns post COVID.

The vertical dashed line from left to right in Figure 3 (above) highlight the demand elevation due to the heat wave in July 2022, TUBs announcement mid-august and finally present position. The variation in 2022 and 2021 demand patterns between mid-August and the end of September demonstrate the impacts of demand-side reductions.

3 DROUGHT PROGRESSION

3.1 Drought monitoring

The Drought Plan sets out how South West Water will monitor the climatic indicators which signal the onset of drought and its severity.

3.1.1 Routine Monitoring

Significant regular routine monitoring of resource status and environmental conditions is carried out throughout the year, even when not in a potential drought period. When routine monitoring starts to identify that South West Water is moving into a drier / more resource constrained situation, the frequency of all monitoring increases.

Examples of some of the routine monitoring which takes place (monthly to weekly under normal operating conditions) includes:

- Monitoring of all reservoir storages, river intakes, boreholes, WTW outputs, planned maintenance and unplanned outage, abstraction and impounding licence compliance, and other constraints on abstractions and outputs;
- Monitoring reservoir storage following normal operational rules, which defines which abstraction sources should be prioritised at different times of year at various storage levels to ensure there is enough water in storage to meet demand through the peak demand period and until reservoirs start to refill in the autumn;
- Spot gauging of river flow and downstream of dams undertaken as a check to ensure automated monitoring instrumentation are recording flow correctly and hence prescribed flow and compensation flow conditions are being complied with;
- Review of external data related to drought triggers including regular Environment Agency and CEH hydrological summaries, and weather forecasts.

A full list of the routine monitoring which takes place can be found at page 31 of the Drought Plan.

3.1.2 Rainfall monitoring

As a dry period develops, South West Water monitors cumulative rainfall totals in the affected area for the relevant period (usually from when the reservoir was last full). As per Environment Agency guidance, South West Water primarily uses Environment Agency data including monthly rainfall totals generated from their Daily Rainfall Tool (recent) and Met Office HadUK (historic) data at the Environment Agency hydrological area scale (large scale river catchment).

Table 2 - Rainfall locations reported on weekly

Area	Rainfall Station	WRZ
Bastreet	Bastreet	Colliford
Helston	Wendron	Colliford
Penryn	Penryn	Colliford
Penzance	Trengwainton	Colliford
St Cleer	St Cleer	Colliford
Roadford	Roadford	Roadford
Ilfracombe	Wistlandpound	Roadford
Fernworthy	Fernworthy	Roadford
Postbridge	Dartmoor	Roadford
Yelverton	Dousland	Roadford
Ottery St Mary	Ottery	Wimbleball
Tiverton	Tiverton	Wimbleball
Bournemouth	Alderney	Bournemouth

3.1.3 Severity of drought, triggers, and actions

South West Water has followed Environment Agency guidance and categorised different severity of drought from Level 1 (less severe, but more frequent droughts) through Level 2 and Level 3 to Level 4 (very rare, but very severe droughts). As a drought develops, South West Water considers different responses or actions appropriate to the level of drought. We are currently in a Level 2 drought.

The Drought Plan sets out the triggers that are used to assess the current level of drought. Further detail regarding these triggers can be found in ***Document 4.0 Evidence the company has followed its drought plan (Section 3)***.

3.2 Rainfall

The ESOR case for this drought permit application is presented in detail in ***Document 2.2 Case for Exceptional Shortage of Rain***. This analysis has found that rainfall over the assessed period (November 2021 to October 2022) is considered to constitute an ESOR.

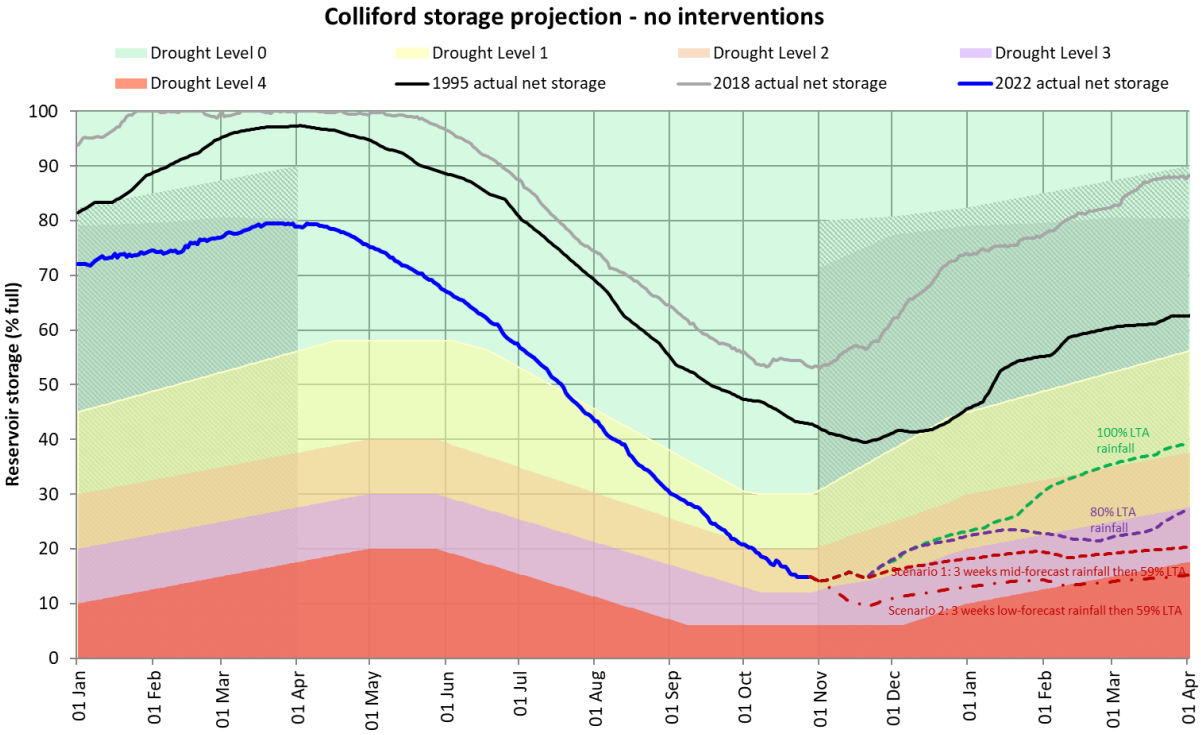
In summary:

- The SPI value for the period of analysis (-1.685) indicates a “severely dry” period, ranked within the fifth lowest SPI values in a record starting in 1891;
- Ranked cumulative rainfall shows the period of analysis to be the fifth driest in a record starting in 1891 and ranked higher than several known drought events across the UK; and
- The rainfall probability ranking puts the period of analysis within the “exceptionally low” probability band at 78% of the LTA.

3.3 Colliford Reservoir

Figure 4 below illustrates the reservoir decline during the summer of 2022 compared with 1995 and 2018 net storage. The drought management zones are indicated by the base colours in figure 4, further explanation of the drought management zones and tiggers can be found in paragraph 3.2 of ***Document 4.0 Evidence company has followed its drought plan***. The net storage for 2022 was 20.8% at the time of the Prospects Report[1] (30 September 2022), this is significantly lower than previous years and far below the operational curve. Current storage (28 October 2022) has reduced still further to 14.9%.

Figure 4 - Colliford Position and projection without intervention on 28 October 2022



Under average year assumptions a storage level of 80% is considered required to avoid Drought Level 1 in the following year.

The projection without intervention for Colliford Reservoir has deteriorated. Figure 4 illustrates that a 100% long term average (**"LTA"**) rainfall scenario the reservoir recovers to 35%, and a 60% LTA rainfall scenario recovers to 15% LTA. Given the ESOR throughout 2022, Colliford Reservoir therefore requires additional winter storage to recover to target of 80% by 1 April 2023, even with the wettest previously experienced winter conditions.

3.4 Other Reservoirs in the WRZ

Colliford Reservoir is part of a conjunctive system and has a net capacity of 65% of the total storage for Colliford WRZ. Reservoir levels across the entire Colliford WRZ are

[1] A prospects report is a forecast requested of water companies by the EA and DEFRA for a future period.

depleted, total storage within the WRZ is currently 21.1% on 28 October 2022. Table 3 below sets out the current reservoir levels of all reservoirs across Colliford WRZ.

Table 3 – Storage Levels of all Reservoirs across Colliford WRZ (correct on 28 October 2022)

Reservoir	Net Capacity (Ml)	Current Level (Ml)	Percentage full
Argal	1302	462	35.5
College	246	187	75.9
Colliford	28540	4252	14.9
Crowdy	1022	549	53.7
Drift	1200	250	20.8
Park Lake	2183	1085	49.7
Porth	514	514	100.0
Siblyback	3182	735	23.1
Stannon Lake	840	571	68.0
Stithians	4967	690	13.9
TOTAL	**43996**	**9295**	**21.1**

4 ACTIONS TAKEN TO DATE

South West Water has implemented a variety of measures prior to the submission of this application to try and reduce water demand. These include publicity campaigns (detailed at Appendix 1 of ***Document 4.0 Evidence the Company has followed its Drought Plan***), leakage control, outage management, pressure reduction and temporary restrictions on water uses through the implementation of a TUB across the area.

Detailed information on each of the measures used can be found in ***Document 4.0 Evidence the Company has followed its Drought Plan (Section 3)*.**

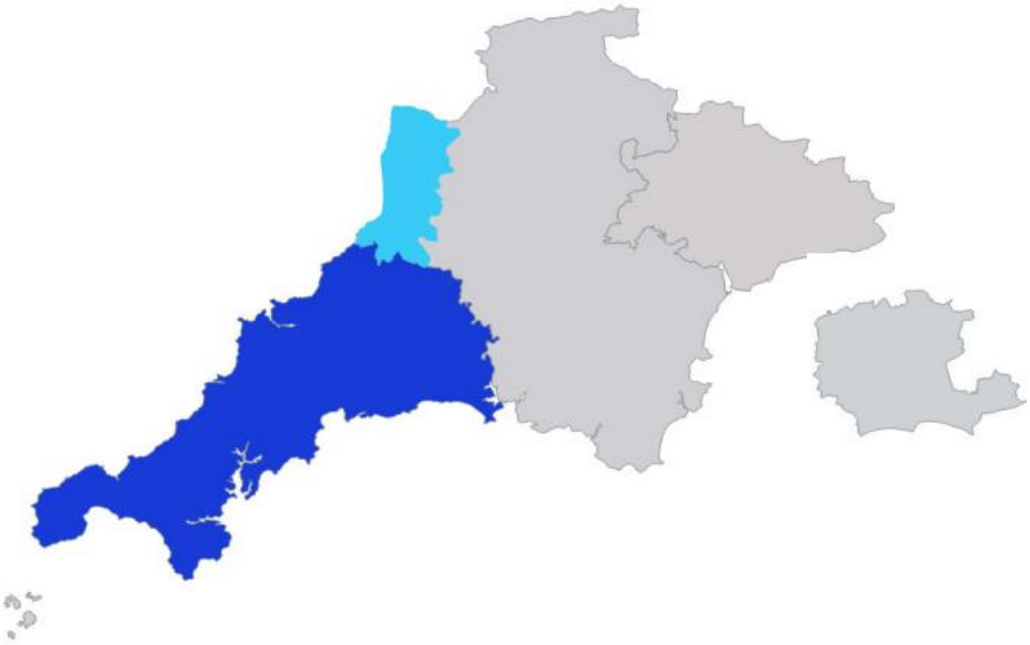
4.1 Temporary Use Ban ("TUBs")

On 15 August 2022, South West Water submitted a notice in the London Gazette and two newspapers which were in distribution within the area notifying the public that a temporary ban on water use ("**TUB**") would be coming into effect on 23 August 2022. The notice was also advertised on South West Water's website and can be viewed here: tub---legal-update-black.pdf (southwestwater.co.uk). The TUB was implemented as part of the Drought Plan (South West Water, 2022).

The TUB restrictions applied across the Colliford WRZ and Tamar Lakes supply area of as shown coloured in two shades of blue on the map below (figure 6).

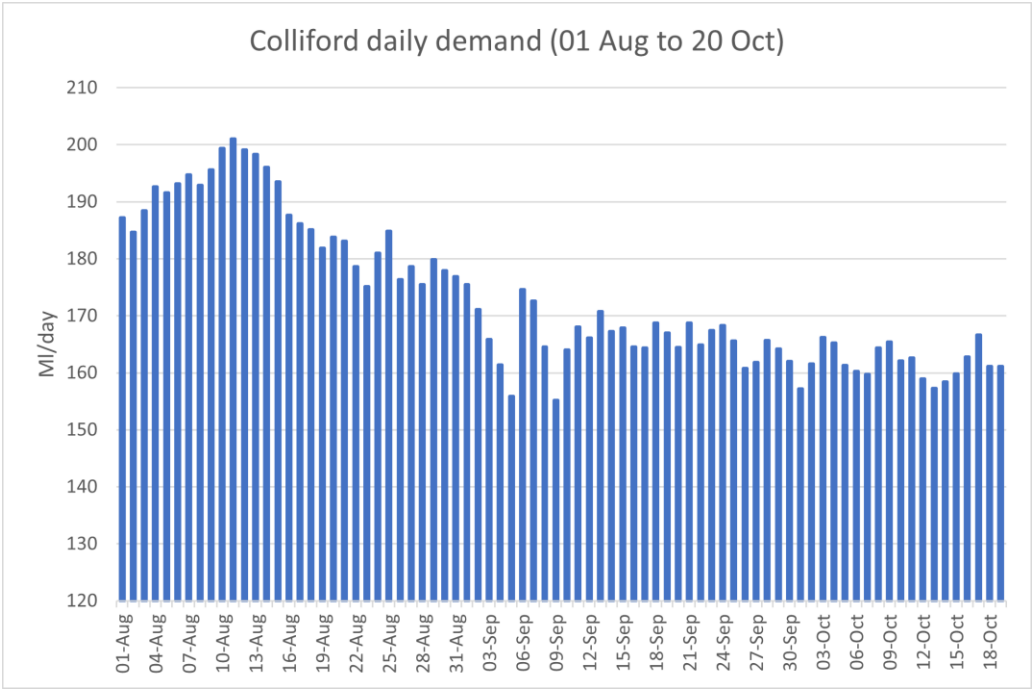
The TUB has been in operation since 23 August 2022 and will continue to be in place until it is deemed no longer necessary. The reservoir storage levels will therefore be monitored to ensure that it is revoked once the triggers are met.

Figure 5 - Map showing the area affected by the TUB



Further information setting out the impact of the TUB can be found in ***Document 4.0 Evidence the company has followed its drought plan (section 3.8)***.

Figure 6 – Colliford WRZ Daily Demand following TUBs



4.2 Leakage and outage

Detailed information on the actions taken by South West Water in relation to leakage and outage can be found in ***Document 4.0 Evidence the Company has followed its drought plan*** at sections 3.6 and 3.8.

To summarise the leakage work throughout 2022:

- South West Water started the year in the best possible reported leakage position: South West Water had its lowest ever regional (1 -7) level of loss, consequently recovering the AMP target and were on track for a 15% reduction by 2025 (regional)
- The winter months of 2022 were not particularly cold, so resources weren't distracted with burst break-out recovery. This avoided the common rise of invisible leakage.
- Our responsiveness to the water stressed areas has been swift and exhaustive for example:
    - Investing £1300k on initiatives to further reduce water losses in the West operating areas (1 & 2), capturing the Colliford WRZ.
    - Internal resources focusing within Colliford WRZ.
    - Doubling the footprint of Active Leakage Control (ALC) staff in operational areas 1 & 2
    - Innovative, some for the first time in South West Water, technologies being deployed:
        - Satellite detection of potable water in the ground
        - Fine detail digital twinning of two DMAs in Cornwall
    - Record levels of leaks found and fixed within Colliford WRZ, close to double the rolling 12-month average. Tracking towards a similar level of high leak repair promotion for month of September.
    - Approximately 30% more customer reported leaks compared to rolling 12-month average – a product of enhanced customer communications relating to dry weather, conservation of water and visibility due to surface dryness. We tackled this by shifting our strategy to repair these leaks free of charge.

4.3 Operational measures

Please refer to ***Document 1.3 Drinking Water Services Report 2022 – Operations Supporting Evidence*** for detailed information regarding the operational measures implemented.

To summarise the operational measures undertaken:

- Utilising strategic networks options across the WRZ, depending on demand conditions and available headroom at various WTWs.
- Working to deliver engineering scheme to facilitate transfer of water from College WTW to the Stithians potable water supply zone, reducing demand on Stithians, and thereby reducing support needed from Colliford.
- Optimisation of WTWs throughout Winter 2021/22 to reduce losses.

- Tankering to respond to peaks in demand during the two major heatwave periods
- Programme to focus on cleaning and maintenance of key process units at strategic WTWs
- Implementing an in-depth site-based risk action plan ("**SBAP**") which identifies resilience enhancements across the entire site asset base. This process has been completed at Stithians WTW and is currently in progress at Restormel WTW.

4.4 Customer Engagement

Please refer to **Document 4 Appendix 1 – Enhanced Media Campaign** for detailed information regarding customer engagement.

To summarise the customer engagement to date:

- From May 2022, South West Water started encouraging customers to take part in the 5 litres challenge, our water efficiency campaign. The campaign was promoted across various channels such as:
  - Our website
  - Direct emails to customers
  - Advertorials
  - Outdoor advertising
  - Social Media
  - Community Events
  - Radio advertising
- We have offered and continue to offer free water-saving products for our customers.
- We have offered and continue to offer personal customers free "leaky loo" fixes as part of increased home audits
- Similarly, we have offered and continue to offer retail customers a “Find & Fix” service.
- From August, the media campaign was changed to prompt urgent action from customers, focusing on reporting water updates, reducing leakage, and tips to save water immediately.
- The focus in September was informing customers of the reservoir levels and continuing to encourage water-saving due to the previous eight months being exceptionally dry, despite rainfall in September.
- Messaging throughout October was strengthened further to ensure a clear and direct message to customers on the need to conserve water. Work was undertaken on the website to simplify the user experience and ensure customers can quickly access water saving tips and advice.

5 THREAT TO SUPPLY AND CASE FOR THE PERMIT

5.1 Forecast effects of continued dry weather on supplies

Due to the continued effect of dry weather, Colliford Reservoir is continuing to drawdown. Without intervention and with worst-case scenario weather forecast we anticipate that Colliford Reservoir could reach approximately c.10% by Mid-November 2022, Drought Trigger Level 3.

At present our forecast above (Figure 4) anticipates that without the drought permits Colliford Reservoir will recover to 35% in a 100% LTA rainfall scenario, 25% in an 80% LTA rainfall scenario and 15% in 60% LTA rainfall scenario.

5.2 Case for permit

The threat to supply case of this permit application applies to the entire Colliford WRZ and necessitates achieving suitable water levels of 80% in Colliford Reservoir before the summer draw-down commences in April 2023. Overall, the company perceives a serious risk to supply. This Drought Permit is an essential requirement to reduce this risk and is the third of a series of intended applications designed to increase the water levels in Colliford Reservoir.

The consequence of the exceptional shortage of rainfall experienced from November 2021 and throughout 2022 has resulted in Colliford Reservoir storage falling to a record low level since impoundment in 1984. Colliford Reservoir is presently (as of 28 October 2022) at 14.9% and crossed Drought Level 2 on 30 September 2022. The immediate risk is escalating, under all circumstances the risk for next summer is significant, necessitating action to prepare for 2023.

This drawdown has been driven by the exceptional shortage of rainfall observed since November 2021. Last year's winter recharge season was lower than average meaning that we started the draw-down period at 80% full. Rainfall has continued to be exceptionally low since April 2022 affording no further recharge.

During 2022, the exceptional shortage of rainfall reduced inflow into Colliford Reservoir to 5081Ml compared to 8518Ml in 2021. South West Water has also released significantly more water for augmentation in 2022 to maintain river flows, 13064Ml compared to 8518Ml in 2021.

In total this volumetric difference contributed to the equivalent of a 31% fall in storage at Colliford Reservoir.

Figure 7 – Colliford Natural Inflow

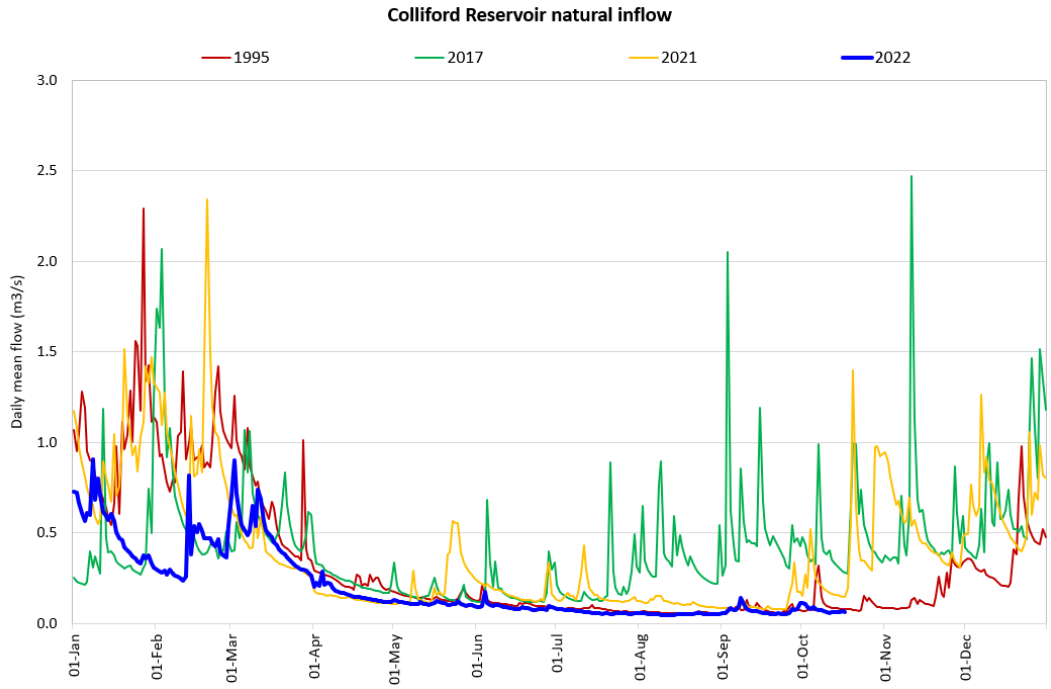
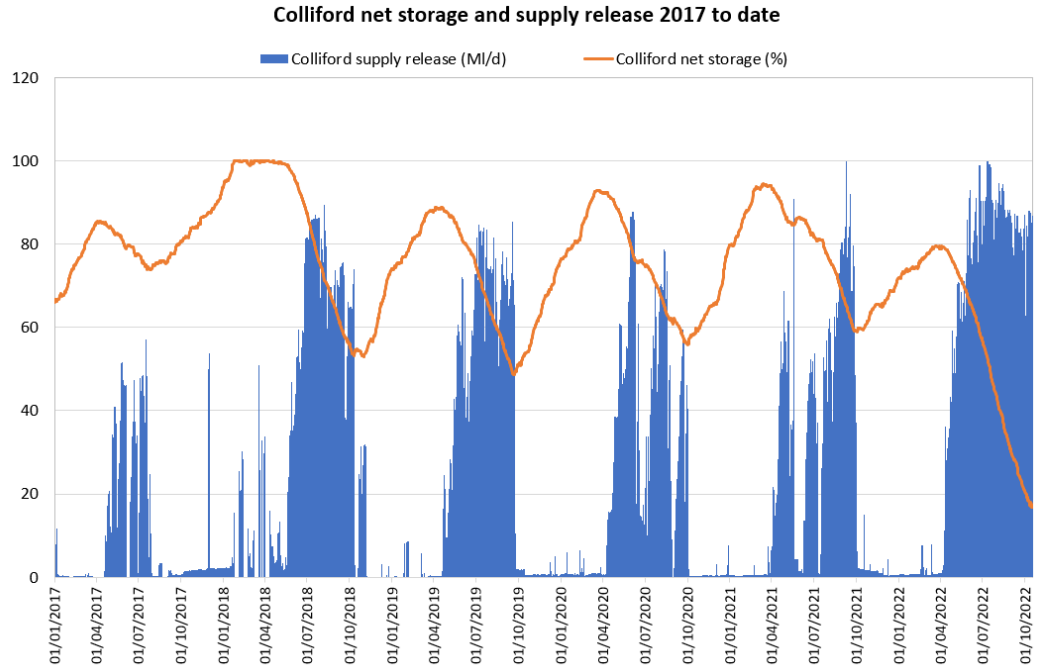


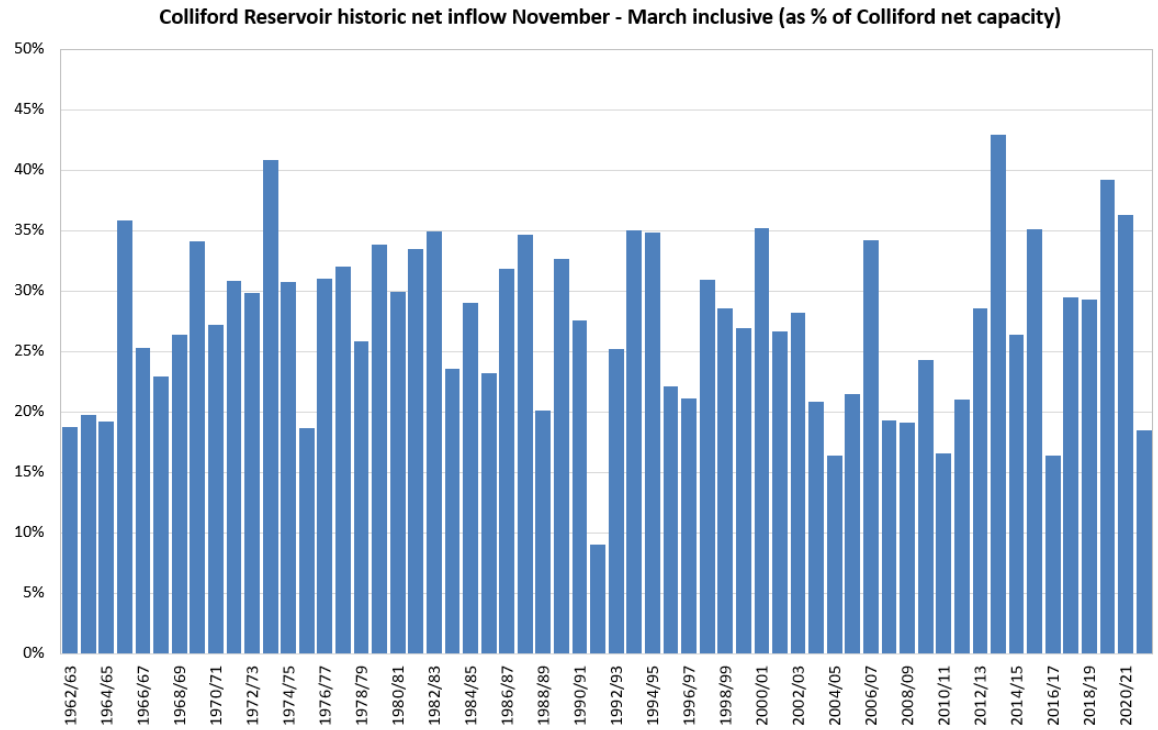
Figure 8 – Colliford augmentation releases and net storage



Without this exceptional shortage of rainfall, and similar inflow and augmentation patterns to 2021, we would have expected Colliford Reservoir storage to have been at c.40% (at the edge of Drought Level 1). Furthermore, other reservoirs within the conjunctive system would also have been at higher levels meaning we would not have needed to rely so heavily on Colliford Reservoir to maintain supply.

Our wettest November to March inclusive period in the Colliford historic inflow record would result in a recharge of 43% of net capacity (based on 2013/14). Figure 10 below shows Colliford Reservoir net inflow for November to March inclusive, from 1962/63 to 2021/22.

Figure 9 – Colliford Reservoir historic November to March net inflow



We have examined the range of winter weather scenarios and believe that relying solely upon the natural recharge for Colliford Reservoir is likely to present a risk to supply in 2023.

In conclusion it has been so dry over 2022 that under all foreseeable circumstances natural refill to suitable operational levels, in Colliford Reservoir, for 2023 is unlikely, and therefore represents the need explore all options to increase storage.

In accordance with our Drought Plan we are progressing preparation for our level 3 action of Porth/Rialton which recommissions a disused source (page A158 with the Drought Plan). We are also advancing preparations for a Non-Essential Use Ban should this become necessary, given current projections.

This is the first permit in relation to the extreme drought “more before 4” supply side actions listed in our drought management plan (page A195) and is being accelerated due to the severity of the current risk. In accordance with our drought plan, we consider that this ‘more before 4’ option at Park Lake is geographically the most beneficial option for supporting Colliford Reservoir, requires minimal engineering works and seeks to maximise water resources before introducing compensation release options.

This application, for Park Lake, has the potential to increase resources by 6 Mld between 10 November 2022 and April 2023; potentially providing an additional 1,032Ml for Colliford Reservoir (c.3.6%).

Park Lake drought permit abstraction, with existing infrastructure, provides an immediate means to assist strategic refilling to Colliford Reservoir.

6 REFERENCES

Environment Agency, 2021, Drought permits and drought orders – Supplementary Guidance from the Environment Agency and Department of Environment, Food and Rural Affairs

South West Water, 2022, Drought Plan, September 2022

7 FIGURES

Figure 1 WRZs in the South West Water Supply area

Figure 2 Key components of Colliford WRZ

Figure 3 Colliford WRZ Distribution Input

Figure 4 Colliford Reservoir storage and projection on 28 October 2022

Figure 5 Map showing the area affected by the TUB

Figure 6 Daily demands from the DMAs supplied by UTL

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Figure 8 Colliford Augmentation Releases and net storage

Figure 9 Colliford Reservoir historic net inflow November - March

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Table 2 Rainfall locations reported on weekly.

Table 3 Storage Levels of all Reservoirs across Colliford WRZ