

2.0 Statement of Reasons

March 2023



1. EXECUTIVE SUMMARY

South West Water is applying for a drought permit under section 79A of the Water Resources Act 1991 ("**WRA 1991**") to use, with temporary amendments, the abstraction licence SW/047/0051/003 as dated 7 February relating to abstraction from the inland water known as the River Lyd at Lifton, Devon for the purposes of Public Water Supply.

The proposed actions set out in this permit will offer support across the entire Roadford Water Resource Zone ("**WRZ**") in response to the Exceptional Shortage of Rainfall ("**ESOR**") from March 2022 and August 2022, which presents an anticipated future risk to the security of supply in 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.

1.1 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	1.0	Description of Proposals
	1.1	Draft Permit
	1.2	Drinking Water Services Report 2023 – Operations Supporting Evidence
	1.3	Appendix 1 River Lyd Abstraction Licence
	1.4	Appendix 2 National Security Notice
2	2.0	Statement of Reasons
	2.1	Case for Exceptional Shortage of Rain (ESOR)
3	3.0	River Lyd Drought Permit Environmental Assessment Report
4	4.0	Evidence the Company has followed its Drought Plan
	4.1	Appendix 1 Enhanced Media Campaign
	4.2	Appendix 2 Leakage and pressure management
5	5.0	Consultation Process
	5.1	Appendix 1 Formal Notice
	5.2	Appendix 2 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 and also includes:

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

The detailed exceptional shortage of rain ("ESOR") case is set out in **Document 2.1**.

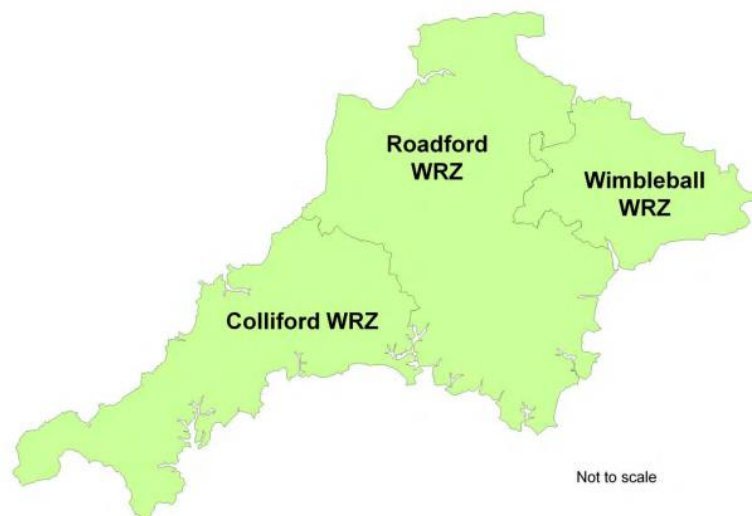
2. SUMMARY OF THE SUPPLY AREA

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

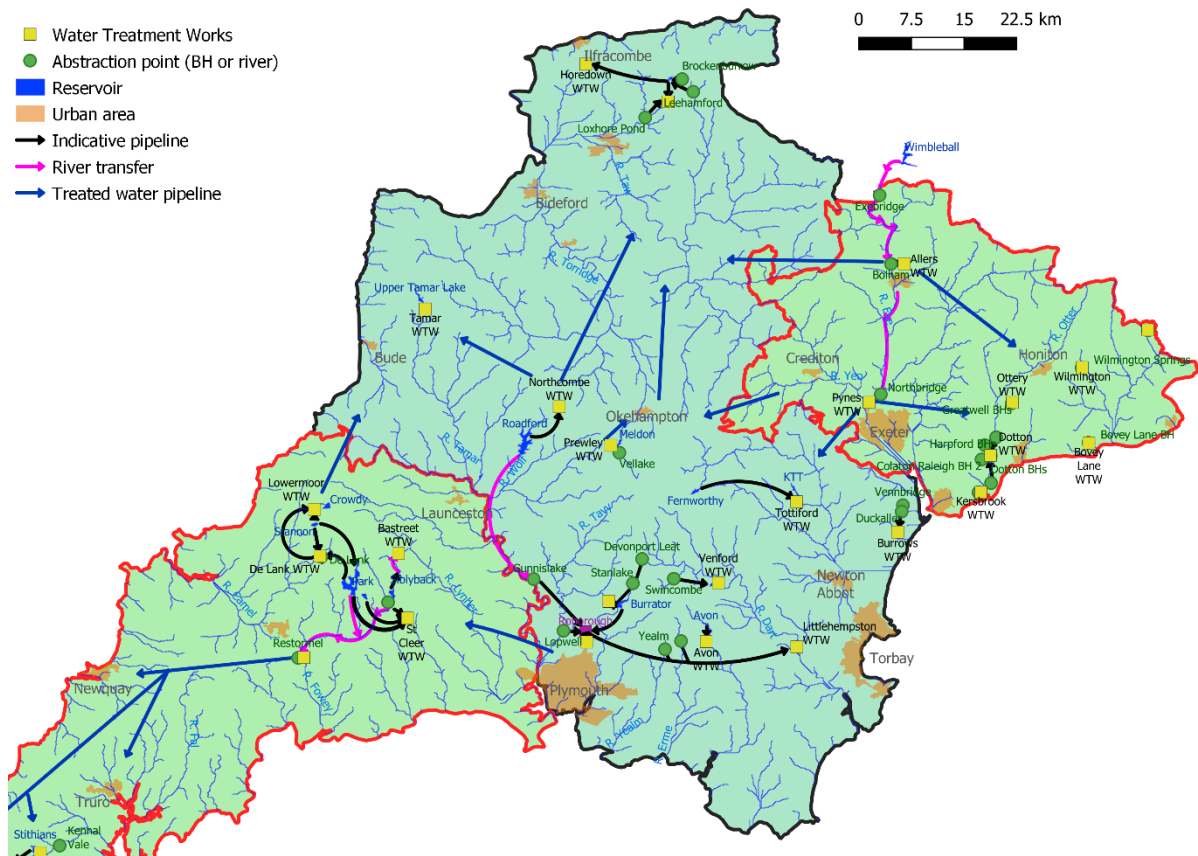


2.2 Roadford Water Resource Zone (WRZ)

The drought permit application is in relation to abstraction from River Lyd which is situated in the Road WRZ.

The Roadford WRZ encompasses all of Devon, serving approximately 422,000 domestic and commercial properties within the zone.

Roadford Reservoir, conjunctively with local reservoirs and river intakes, from the Roadford WRZ. These sources can also supplement a bulk transfer from Roadford to Colliford WRZ of up c.3 MI/d.



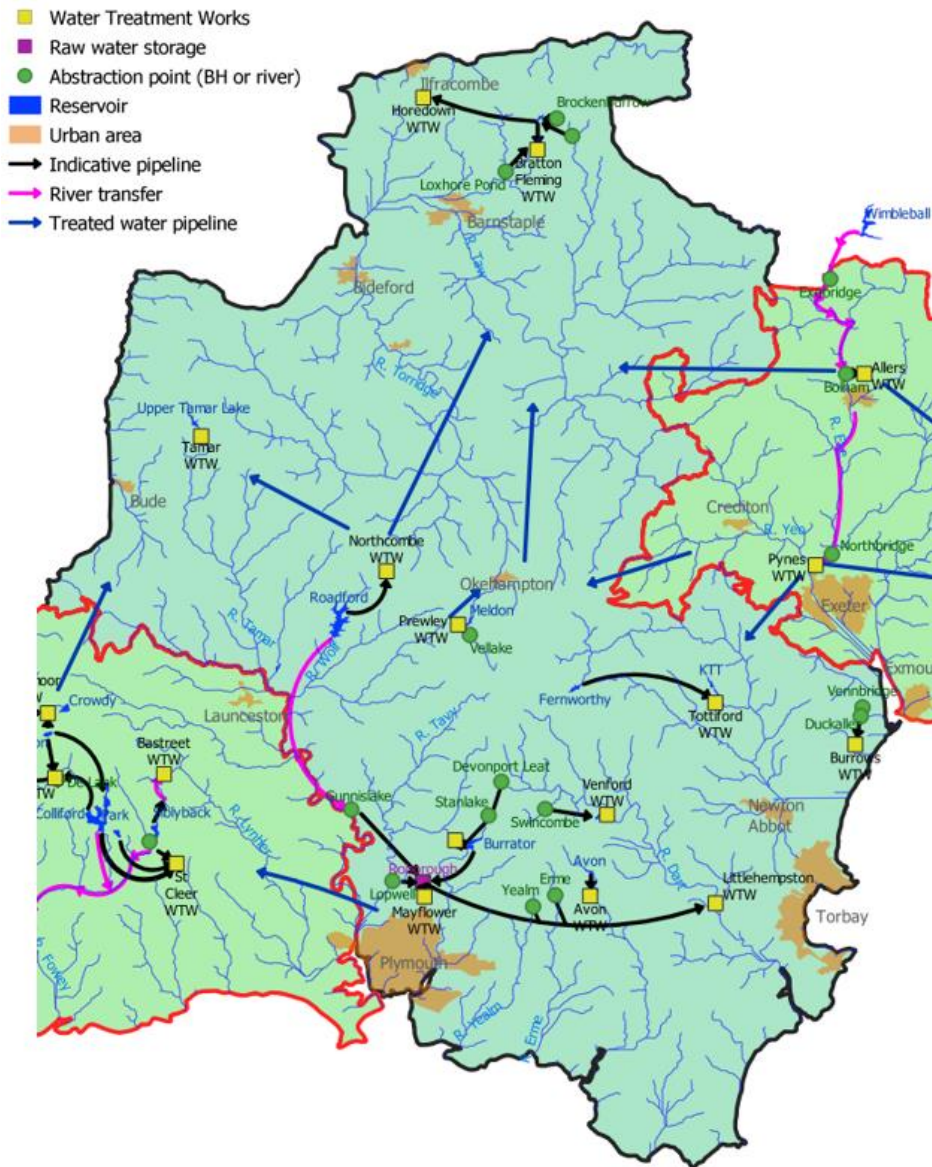
The supply system in Roadford WRZ is reliant upon the strategic Roadford Reservoir. Several supply sub-systems are supported by Roadford Reservoir and Northcombe WTW, especially during periods of peak demand.

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 Roadford Reservoir or Northcombe WTW).

There is a link between Roadford Reservoir and Mayflower and Littlehemston WTW because when there is not enough river flow to supply treatment at Mayflower and Littlehemston WTW the water is released from Roadford into the river, to then be abstracted for treatment there.

Roadford Reservoir has a total net capacity of 34,500 MI and sits in the River Wolf in the headwaters of the River Tamar. The catchment area upstream of Roadford Reservoir dam is 31.8 km² (QUBE, 2023) and it receives 1146 mm of annual rainfall (NRFA – SAAR 61-90). The catchment has a baseflow index (BFI) of 0.38 which reflects the low permeability hydrogeology of the catchment which means it generally responds quickly to rainfall events but a return to river flow recession can also occur quickly. The hydrological catchment area is relatively small compared to the total reservoir capacity which means that it can be slow to recover its storage position.

Figure 2 - Key components of Roadford WRZ



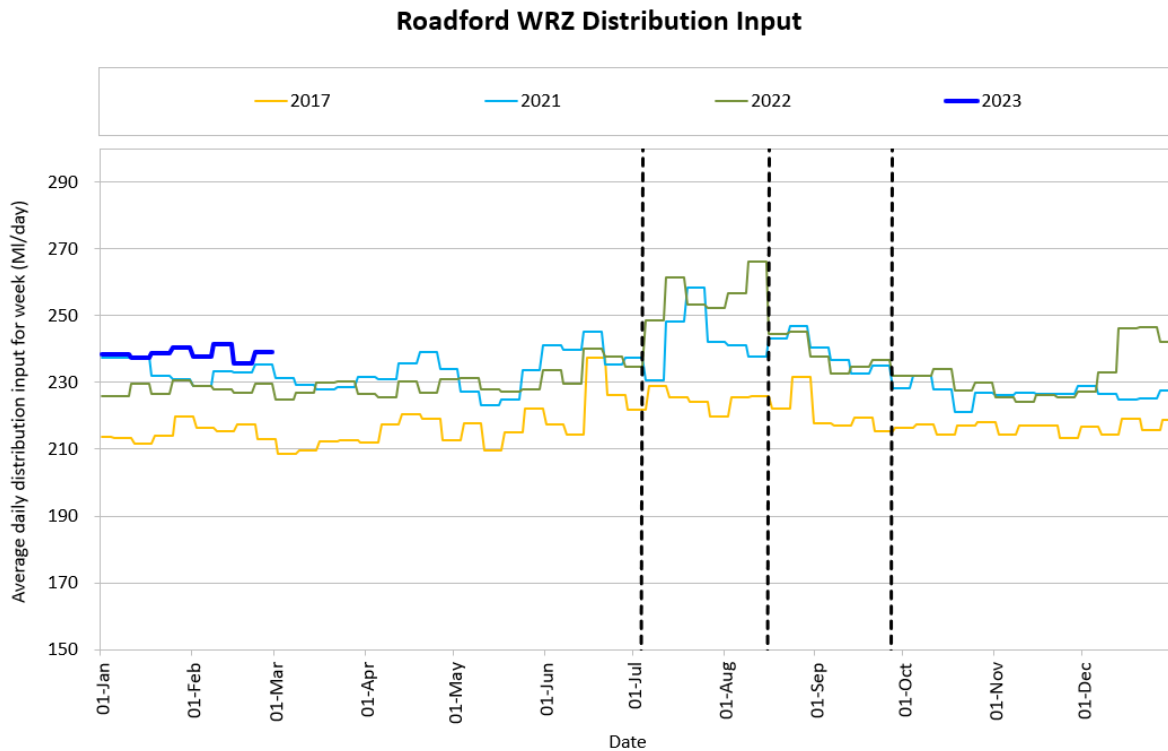
Details of the current abstraction licence at the River Lyd can be found in **Document 1.3**.

2.3 Supply of daily water demand

In 2022 South West Water supplied an average of 249.5 MI/d of water in the Roadford WRZ.

During summer 2022, South West Water took measures to reduce consumption because of the reducing storage levels in the Roadford 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.

Figure 3 – Roadford WRZ Distribution Input



Throughout 2022 distribution input 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).

Following the winter freeze thaw in late 2022 distribution input has increased and South West Water has focused additional resources to drive down water losses in this area. This includes offering customers free private leak repairs.

3. DROUGHT ROGRESSION

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.

Significant regular routine monitoring of resource status and environmental conditions is conducted 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.

3.2 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

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)**.

3.3 Rainfall

The ESOR case for this drought permit application is presented in detail in **Document 2.1 Case for Exceptional Shortage of Rain**.

In summary:

Devon, Cornwall and the Isles of Scilly remain in official “drought” status following the period of dry weather which started in November 2021. This report demonstrates the Exceptional Shortage of Rainfall (ESOR) in Roadford Water Resource Zone (WRZ) from March 2022 to August 2022 and its subsequent impacts on the hydrological and water supply system which lead to South West Water’s application for a drought permit in the Roadford WRZ in March 2023.

Rainfall analysis has been undertaken for a “main period” from March 2022 to February 2023 and a “sub period” from March 2022 to August 2022. The analysis uses established techniques outlined in the Environment Agency technical ESOR guidance using the Environment Agency’s DRT rainfall dataset for the Roadford WRZ. Analysis of additional variables has also been included to demonstrate the subsequent impacts of the ESOR on the hydrological and water supply systems.

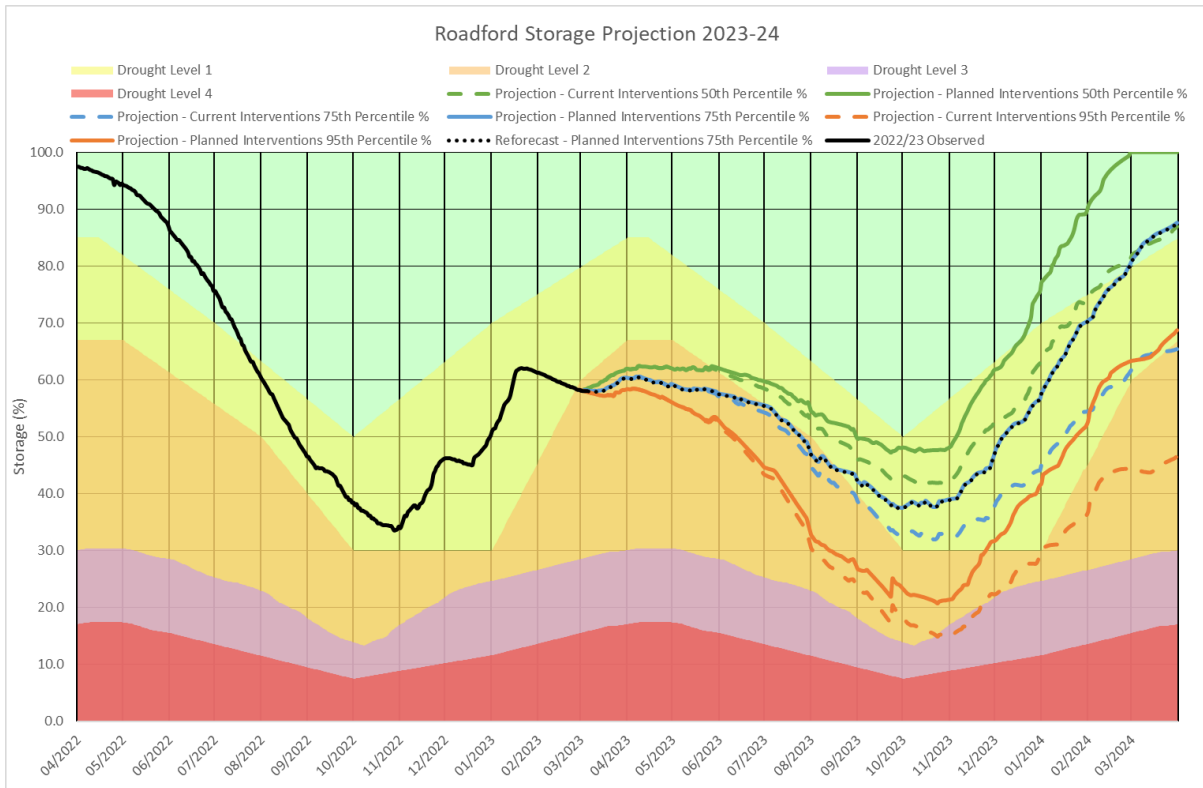
The conclusions from this ESOR assessment demonstrate;

- Roadford WRZ rainfall for the “main period” March 2022 to February 2023 is categorised as “Normal” based on ranked rainfall probability bands. The analysis demonstrates the first 6 months covering the “sub period” had only 58.5% LTA rainfall and the second 6 months from September 2022 to February 2023 had 121.73% LTA rainfall.
- Roadford WRZ rainfall for the “sub period” from March 2022 to August 2022 was the 3rd driest on record, categorised as “Exceptionally Low” based on ranked rainfall probability bands and “Extremely Dry” based on rainfall SPI analysis.
- Soil Moisture Deficit (SMD) reached record maxima in August and September and had the longest period of deficit on record from March 2022 to November 2022.
- There was no Hydrological Effective Rainfall (HER) between April and October and total HER was only 22% of LTA from March 2022 to October 2022.
- Inflows to Roadford reservoir reached historical monthly minima in April and May 2022 and the hydrological position across the WRZ did not start to recover until modest increases from September 2022 and large increases in November 2022.
- The 2022 event is the longest sustained drawdown on Roadford Reservoir since the 1995 drought event with minimum levels of 33.5% reached in October 2022. This is a direct consequence of the length of time supply releases were being made due to the low River Tamar flows and the low resources in local sources across the WRZ.
- Dry weather in early December and from mid-January to the start of March caused reservoir storage to drop between periods of recovery and Roadford Reservoir levels are currently at 60.7% and have entered drought level 2.
- Roadford Reservoir is susceptible to multi-season impacts due to the modest potential for storage recovery between years and an Exceptional Shortage of Rainfall can have impacts into subsequent years.
- The 3-month outlook for March to May suggests a “higher than normal chance of a dry spring” which means the effects of the March 2022 to August 2022 ESOR are therefore more likely to be exacerbated due to limited further recovery before we enter the 2023 reservoir drawdown period.

3.4 Roadford Reservoir

Figure 4 below illustrates the reservoir’s net storage movement. 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**. Following a very dry February, current storage is at 60.7%.

Figure 4 - Roadford position and projection



3.5 Other Reservoirs in the WRZ

Roadford Reservoir is part of a conjunctive system. Table 3 below sets out the current reservoir levels of all reservoirs across Roadford WRZ.

Table 3 – Storage Levels of all Reservoirs across Roadford WRZ

Reservoir	Net Capacity (MI)	Percentage full
Avon	1313	100
Burrator	4210	96.0
Fernworthy	1765	100
KTT	2011	86.6
Meldon	3020	100
Roadford	34500	60.7
Upper Tamar	1477	100.0
Venford	740	100
Wistlandpound	1550	100

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 in Document 4.1), leakage control, outage management and pressure reductions across the area.

4.1 Temporary Use Ban ("TUBs")

On 26 February Roadford Reservoir crossed Drought Level 2. Since last year we have been communicating with customers within the region asking them to reduce their water use.

The company has also actively prepared for the implementation of a TUB for the Roadford WRZ. The implementation requires internal approval and the proposal to implement the TUB is currently going through the company's internal governance process so that its implementation is at a time which will have most impact on customer demand.

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 4.2**.

To summarise the leakage work throughout 2022 and to date in 2023:

- 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 were not 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 £1,500k to support winter recovery
 - Internal resources refocused to Roadford WRZ.
 - 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
 - Continuing to offer free repairs for customers.

4.3 Operational measures

Please refer to **Document 1.2 Drinking Water Services Report 2023 – Operations Supporting Evidence** for detailed information regarding the operational measures implemented.

To summarise the operational measures undertaken:

- Using strategic networks options across the WRZ, depending on demand conditions and available headroom at various WTWs.

- Network changes have provided c.2.3 MI/d of sustainable benefit to the Roadford supply zone. Available water from Tamar WTW has been used to reinforce supplies to the Roadford supply zone and therefore reduce the demand on Northcombe WTW and Roadford Lake.
- Through Winter 2022/23 the engineering maintenance team conducted a review of all WTW losses and conducted a programme of work to optimise these where appropriate. At Northcombe WTW all filter run times, works flow control, filter drain down times and sludge were optimised to allow increased production output, this water in turn was made available for the Northcombe supply area.
- 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

4.4 Customer Engagement

Please refer to **Document 4.1** 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.
 - We offer retail customers a "Find & Fix" service.
 - From August 2022, 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 from September 2022 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 has continued throughout the winter 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.
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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, more recently culminating in exceptionally dry weather in February 2023, Roadford net storage entered Drought Level 2 on 26 February 2023.

In an average year, reservoir storage is forecast to recover to around 70% by March 2024 which leads to further significant risk in Summer 2024 due to the multi-season nature the Roadford Reservoir system.

The threat to supply relating to this permit application applies to the entire Roadford WRZ and necessitates increasing water levels in Roadford before the summer draw-down commences in 2023. The company perceives a serious risk to supply. This Drought Permit is an essential requirement to reduce this risk and is designed to increase the water levels in Roadford Reservoir.

The consequence of the exceptional shortage of rainfall experienced from has resulted in Roadford Reservoir storage falling to a low level, Roadford Reservoir is presently (as of 18 March 2023) at 60.7% having entered Drought Level 2 on 26 February 2023. The risk to supply for this summer is significant, necessitating action to prepare this Drought Permit application.

Figure 7 – Roadford Natural Inflow

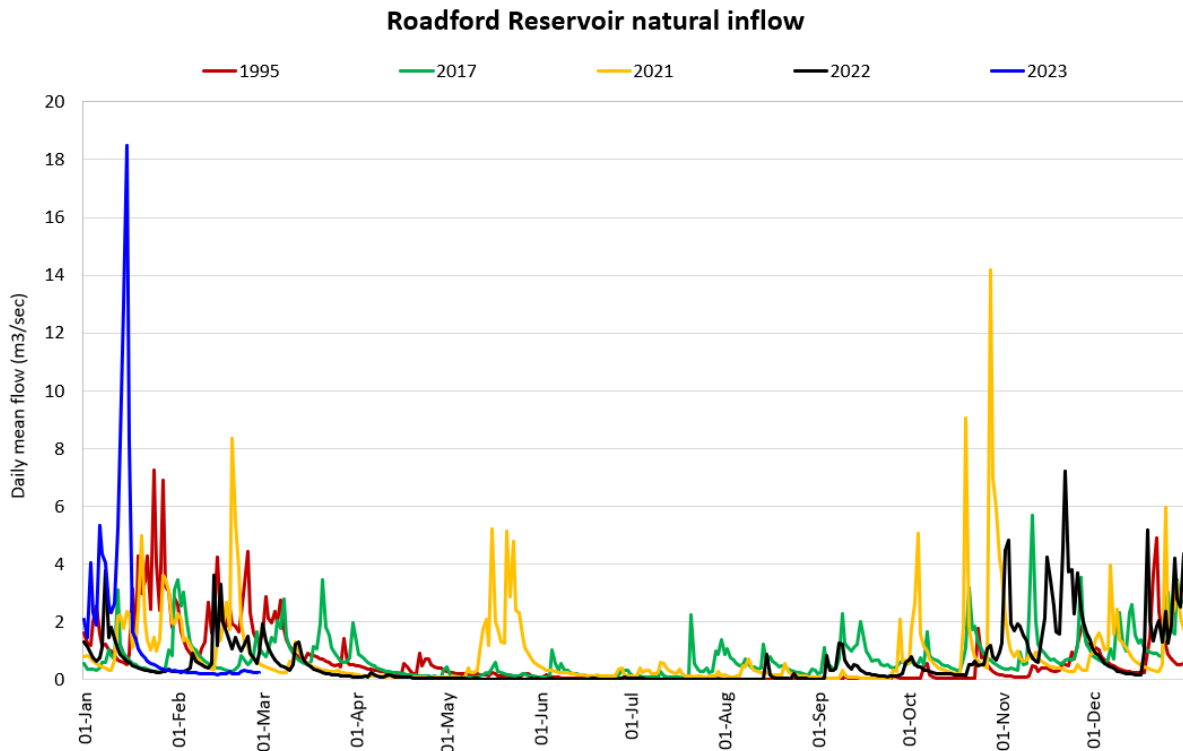
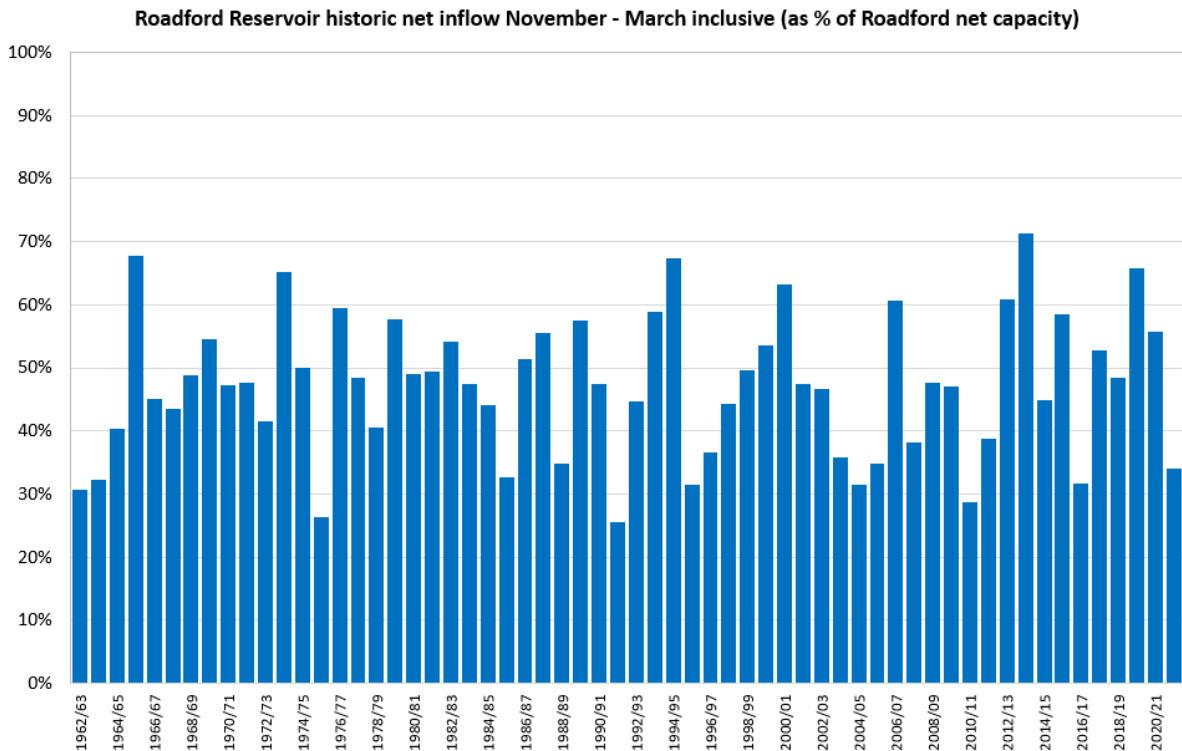


Figure 8 – Roadford Reservoir historic November to March net inflow



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

In conclusion it has been so dry over 2022 and in February 2023 that under all foreseeable circumstances natural refill to suitable operational levels, in Roadford Reservoir, for 2023 is unlikely, and therefore represents the need explore all options to increase storage. The additional water from River Lyd will help us allowing more water to be stored in Roadford 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.
