Cambridge Water














Cambridge Water

Water Resources Management Plan 2019

Annual Review 2023/24

Securing your water future

Contents

1. Executive summary

1.1 Purpose

This document sets out Cambridge Water's water resources management plan (WRMP) annual review for the period 1 April 2023 to 31 March 2024. While South Staffordshire Water PLC incorporates the South Staffs Water supply area, this document applies only to the Cambridge Water region.

The purpose of the annual review is to identify any material changes to the WRMP and to report on progress made during the previous 12 months. **We are not reporting any material changes to our latest WRMP published in December 2019 (WRMP19).**

1.2 Overview

The summer of 2023 was a fairly mild summer, except for record breaking June heatwave and prolonged long periods of dry weather. This led to our peak day (106.0 Ml) occurring on 11th June, when historically peak demands occur during July, and followed 29 consecutive days without rain and temperatures exceed 29°C. Average Day Peak Week (103 Ml/d) occurred on 16th June and coincided with the dry/warm spell.

The winter of 2023/24 was also very mild, with a short cold snap where temperatures fell below freezing in late January. This led to an increase in demand of around 4 Ml/d over two days, due to a freeze thaw event that occurred over 14th-15th January.

The mild summer and winter of 2023/24 resulted in an average day of 84.3 Ml/d, which is a decrease on the average day for 2022/23 (87 Ml/d), but a small increase on the average day of 2021/22 (83.4 Ml/d). However, the winter recharge period at the end of 2023/24 saw above average rainfall. February was exceptionally wet, the second wettest on our record since 1870. With additional recharge we have seen a full recovery to groundwater levels following the previous year, leading to groundwater levels above average and in some case exceptionally high.

Other key points include the following:

- Our WRMP19 leakage target for 2023/24 is 11.5 Ml/d. Our outturn leakage position for the year is 12.3 Ml/d. Whilst this is higher than our WRMP19 position, this is due to the PR19 final determination and changes to our leakage target. Our outturn position is, therefore, lower than our Ofwat target of 14.4 Ml/d.

- The volume of water that each of our household customers uses – the 'per capita consumption' (PCC) as an average was 119.4 litres/head/day (l/h/d). This is a decrease from last year when this average figure was 139 l/h/d. For comparison, the dry year annual average WRMP19 forecast average PCC for the Cambridge region in 2022/23 was 134.9 l/h/d. This means we have successfully reduced PCC in the region. Commentary in Section 4.2 will expand on this narrative in more detail.

2. Introduction

We published the latest WRMP for our Cambridge region in December 2019; this plan came into effect from 1 April 2020 for the period to 2045. This is the fourth review of our current WRMP. We have used the 2024 annual performance report (APR24) data covering the period 1 April 2023 to 31 March 2024 to inform this review. The data used in APR24 has been through our assurance process.

This review is a statutory requirement of the Water Industry Act 1991 (as amended by the Water Act 2003), which states that:

> Before each anniversary of the date when its plan was last published, the water undertaker shall –
>
> (a) Review its plan; and
>
> (b) Send a statement of the conclusions of its review to the Secretary of State.

The purpose of the annual review is to identify any material changes to the WRMP and to report on progress. We have carried out this review in accordance with the Environment Agency's latest guidance, which advises that we should:

- report on the progress against our WRMP;
- highlight any changes made to our WRMP;
- describe progress with key components of our WRMP;
- explain any changes to planned deliverables;
- describe any changes due to exceptional events;
- report on the actions the Defra, Ofwat and EA, asked us to work on after we published our final WRMP; and
- report an overall summary of the supply-demand situation.

2.1 Water resource zones, level of service and performance commitments

Item	Description	Company comment on review
Water resource zones	Any changes to boundaries or number of zones?	There have been no changes to the Cambridge region water resources zone boundary, which remains a single water resource zone for the region.

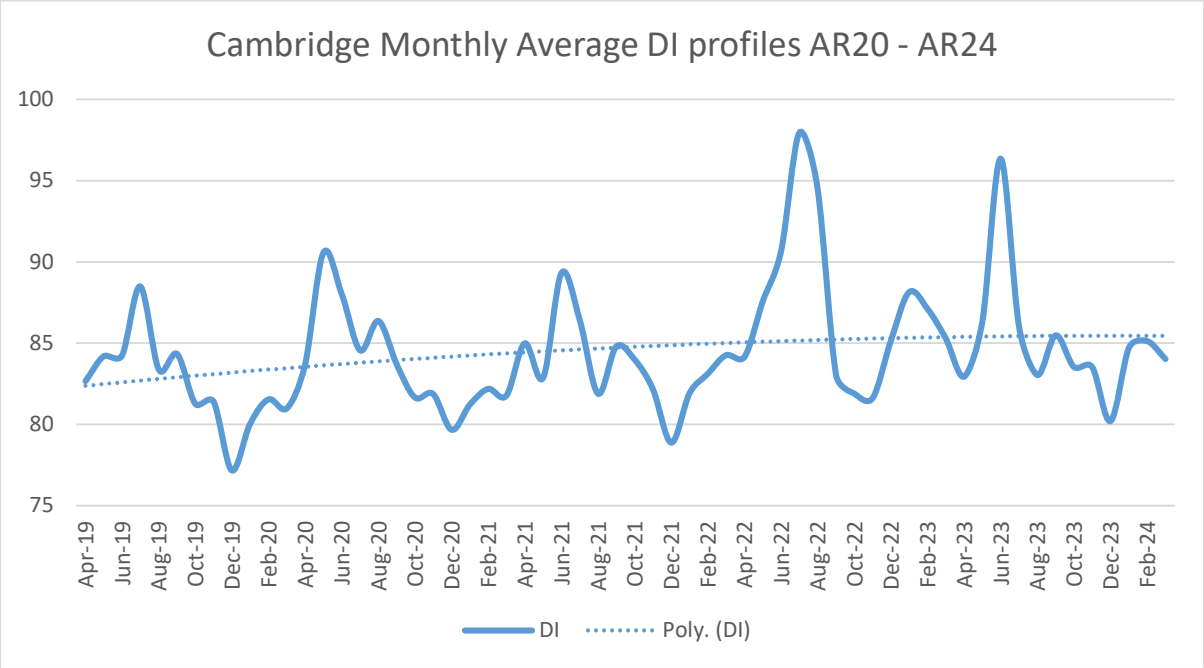
Item	Description	Company comment on review
Planned levels of service	Any changes to the level of service?	There is no change to our customer level of service stated in WRMP19. We consulted extensively with our customers as we prepared our business plan for 2020 to 2025, and they did not support a change to our levels of service, which are: • temporary use bans – not more than one in every 20 years; • non-essential use bans – not more than once every 50 years; and • emergency drought orders – not more than once in 100 years. Note: the drought resilience level of service shown in table 10 of our WRMP19 is derived in an entirely different way to the customer led level of service described here.
Performance commitments (PCs)	Progress on PCs that affect WRMP19	The 2020 to 2025 (AMP7) PCs relevant to WRMP19 are: • leakage. • PCC. • unplanned outage; and • our environmental programme (WINEP) obligations. We describe each of these topics in the chapters below on supply and demand. Other PCs such as drought resilience and the abstraction incentive mechanism (AIM) also indirectly relate to WRMPs.

2.2 Overview of 2023/24 supply-demand balance

The reporting year was noteworthy because of the record-breaking June heatwave and the long period with no rainfall being recorded.

The only period of a winter freeze/thaw event was seen over two days between 14th and 15th January 2024 seeing a period of increased demand due to increased leakage.

Figure 1 Monthly DI profiles APR20 – APR24



We can see that there was an increase in demand in 2020 when we were at peak restrictions due to Covid-19, which reduced the following year as working patterns settled into new routines and restrictions eased.

Our largest peak in Distribution Input (DI) occurred in 2022/23 where the average DI was 87 Ml/d, slightly above the dry year annual average (DYAA) forecast in WRMP19 of 82.5 Ml/d. Despite this increased demand in 2022/23, the security of supply for our customers was not threatened and we did not restrict customers' use as we did not reach the drought trigger in our drought plan for temporary use bans.

In 2023/24 2023 we saw record breaking June temperatures and in winter there was a two day freeze-thaw event. The average DI was 84.32 Ml/d, compared to the dry year annual average (DYAA) forecast in WRMP19 of 81.79 Ml/d. Overall, the outturn supply demand balance was -0.52 Ml/d, compared to 2.71 Ml/d forecast in WRMP19.

As with 2022/23, the security of supply for our customers was not threatened and we did not restrict customers' use. We continued our regular liaison with the EA (at a local and national level) and other key stakeholders through regional groups such as Water Resources East (WRE).

2.3 Company-specific actions

On 20 October 2023, we received a joint regulator letter from the EA, Ofwat and Defra raising concerns around a number of areas in our WRMP19 Annual Review for 2022/23. These are detailed and updates provided below

Supply demand balance
We continue to work on our plans to remove the forecast supply-demand deficit reported in 2022/23, and this is reflected in the improved position reported for 2023/24. Whilst this remains short of the WRMP19 forecast of 2.71 Ml/d, we have made improvements in planned outage and source reliability and outputs, however, we have also experienced some water quality driven longer term outages due to nitrates and PFAS which have taken longer to resolved to the satisfaction of the DWI. These have impacted the SDB figure for 2023/24, but will be resolved for 2024/25 with the plans that we have already implemented or will be doing so throughout 2024.

Demand
Concerns were raised that reported DI was higher than forecast. 2023/24 outturn demand remains around 2.5 Ml/d greater than forecast in the WRMP but within target headroom, and has decreased from recent years. This is despite continued growth in the area and an increased rate of growth in both household and non-household, indicating that the demand management measures that we are undertaking are being effective in curbing some of the potential increases in demand. This is also supported by the reduction in PCC reported for 2023-24. With our WRMP24 proposals, our demand management savings will increase further.

Leakage
We are below the target for leakage as set by Ofwat, for which we are funded to deliver, although this is above the WRMP forecast as this inconsistency between the WRMP forecast and Ofwat target remains. More ambitious leakage reductions are proposed for WRMP24, and if the funded target is changed, we will ensure consistency within future WRMP forecasts by adjusting as required.

Metering
Our levels of meter penetration have improved marginally on last year, as we continue to meter new properties as well as increasing our coverage. Our WRMP24 proposals to complete universal metering in AMP8 will be a step change in our metering approach, which presently is focused on customers opting for a meter which is limiting factor on achieving forecast levels of meter take-up.

Supply Schemes
The benefits from supply schemes in WRMP19 were revised downwards by 0.9 Ml/d, however, we have been able to increase yields at several other sources which more than offsets this reduction and this is reflected in our revised deployable output figure. The proposed supply schemes would have contributed to an overall SDB of 5.59 Ml/d by the end of the WRMP19 period, more than target headroom, to allow for additional supply resilience. Whilst we remain committed to introducing this supply resilience a further supply scheme – CW4: SIPW recommissioning will now be deferred to deliver benefits in 2025/26, this is so that the scheme can be appropriately designed and constructed to allow for the water quality challenges.

In developing our WRMP24 plans, and to address the significant increase in sustainability reductions required for no deterioration from WRMP19, we have developed further supply options and increased demand management.

2.4 Dry year annual average

The AR24 outturn Annual Average DI of 84.32 Ml/d was 2.53 Ml/d above the DYAA of 81.79 Ml/d in the WRMP19. This uses daily pre-MLE DI values are used, as per the guidance. The DYAA peaking factor applied to consumption in the Cambridge WRMP19 was 4.5%. This has been applied in the dry year uplifted data table to all demand components.

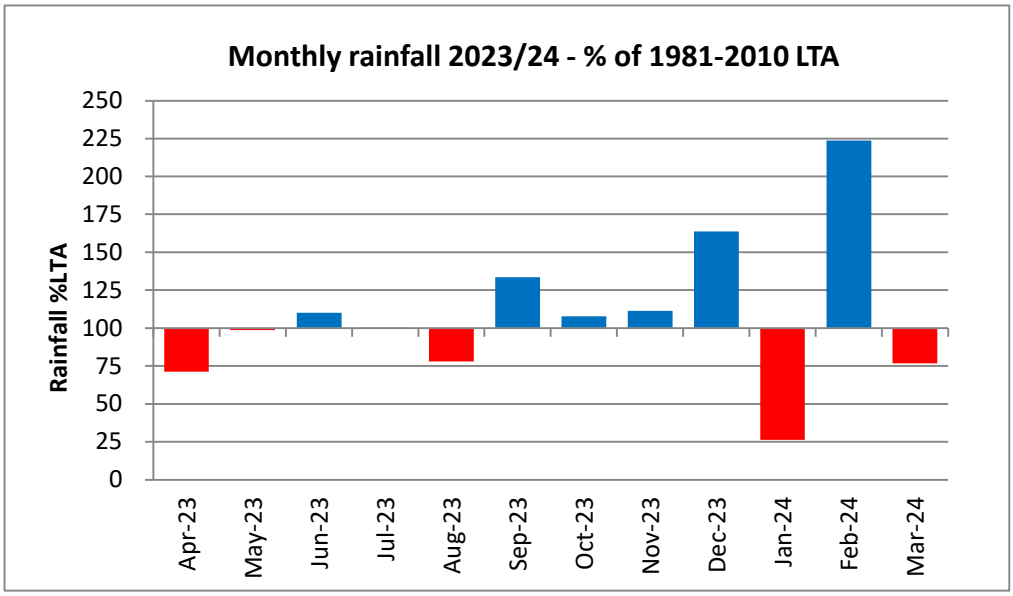
For the supply components, the dry year uplifted table deployable output is stated as the 1:200 drought yield, adjusted for any additional dry year constraints, such as licence conditions. Raw water losses, treatment works losses and operational use is as per the WRMP19 tables without uplift, as operational use would be minimised in a dry year and this element is the most variable in normal years, the WRMP19 figure is based on relatively consistent treatment works losses. For the outage component, we have excluded planned and reduced outturn unplanned by 20% as enhanced activity to reduce outages would be in place for a dry year.

3. Supply

3.1 Impact of weather on supply

Total annual rainfall for the 2023/24 year was 613 mm, which is 108% of the long-term average, as measured from 1981 to 2010. Monthly rainfall in comparison to annual long-term averages is shown below.

Figure 2 Monthly rainfall 2023/24



Despite 2022/23 being a dry year overall, the winter saw good recovery of groundwater levels and during 2023/24 these returned to average levels. Following a wet December and exceptional rainfall in February, recharge was very high and groundwater levels were above average by the end of the report year.

3.1.1 Water Resources

Our raw water abstracted figure of 87.78 Ml/d aligns with our abstraction licence returns. The Cambridge Deployable Output Planner has been developed by the Water Resources team to provide a guide for abstraction across the year to more efficiently utilise and protect our abstraction licences. It is intended to predict the general utilisation of each abstraction site based on historical usage, such as typical summer peaks or expected lower groundwater and river levels. This approach will provide an outline of the abstraction picture across the year, showing the remaining abstraction licence volumes not already allocated. We review on at least a fortnightly basis and can then plan to utilise our licences efficiently and refine our annual forecast through the year.

Our Supply and operational teams undertake frequent meetings to discuss the current water supply and demand situation which are escalated in summer and winter periods or as demand increases or other operational events determine a need.

3.1.2 Communicating with the Environment Agency

We have been sending weekly situation reports to the EA to explain our strategic position as well as any forecast changes that could affect our water supply and demand. We have also identified duplication of meetings between South Staffs and the EA, creating inefficiency as information was often being repeated on different meetings with similar people. We have worked with the Environment Agency to reduce these duplicated meetings and improve their relevance.

3.2 Outage

Total outage for 2023/24 was 8.26 Ml/d, above the WRMP19 forecast of 4.8 Ml/d. This was mostly unplanned outage and a significant amount is attributed to raw water quality issues rather than asset health. A downward adjustment was made to deployable output of 9.44 Ml/d due to long term outages at three sources lasting more than three months. These three outages were due unplanned water quality issues and a significant asset failure. Only 0.7 Ml/d of outage was due to planned works, reflecting our ability to minimise planned work outages. We continue to balance the need for essential work on our assets to be carried out with the need to be able to provide resilient supplies.

The mode of failure for outages and duration within the period is summarised below, excluding where an adjustment has been made to deployable output. The greatest amount of outage is attributed to treatment issues. We have an ongoing capital programme of works to upgrade and improve the treatment capability across our sources, several of which were completed during the year at sources of larger output, and it is expected that this will reduce. Several of our iron exchange plants for treating nitrates have recently completed significant services and are expected to be more reliable going forward as a result.

Table 1 Outage breakdown

Outage category	Total Days
Power failures	10.6
Planned works	15.7
Treatment issues	351.4
Raw water quality	154.0
Pumping assets	120.9
Other	16.5

Our regular maintenance plan continues, and we have introduced an outage planner to reduce the risk of planned outage and maintenance work impacting on the supply demand

balance. Our unplanned outage policy tracks outage using a traffic light system for escalation of outages in relation to extended period of downtime and impact on supply.

Green: water resources and demand are normal; unplanned outage to be responded to next working day.
Amber: water resources are below average or demand is above average; unplanned outage to be responded to same day.
Red: water resources are below average and we are below the drought monitoring curve; unplanned outage must be responded to within 2 hours.

3.3 Water Quality

The below details the current DWI notice we have:

Sawston Mill - SST-2022-00001 - As part of our DWI improvement program Sawston Mill WTW was returned into supply during 2024 following the successful delivery and commissioning of the treatment process solution. We continue to keep all our comprehensive risk assessment under continual review for PFAS compounds and conduct surveillance including sampling and analysis for PFAS in line with Inspectorates latest published guidance on PFAS. As part of our PR24 improvement program we also have an undertaking to secure of facilitate compliance with the PFAS wholesomeness requirement.

Morden Grange WTW - CAM-2023-00001 – Nitrates. Morden Grange is a site where two of three boreholes have been out of supply greater than five years due to the risk and frequency of nitrate levels exceeding the PCV (50 mg/l).

During the end of 2023 we have observed an increase in nitrate levels across the majority of our groundwater sources associated with unprecedented levels of rainfall and rapid aquifer rapid recharges. This has proved challenging and the need for some sites to be removed from supply due the blending regime being unable to maintain nitrate levels below our internal trigger. We are currently looking across all of our sites at nitrate vulnerability. As part of the nitrate working group we are exploring options for the management of nitrate levels, and reviewing our AMP8 plans as included in our PR24 submission to prioritise these schemes.

3.4 Water Industry National Environment Programme (WINEP)

3.4.1 Sustainability changes

We have made no alterations to the indicative sustainability changes included in our WRMP19. The forecast reductions have not been included in deployable output as they are due to be implemented in 2025 or later. Licence conditions resulting from AMP6 schemes delivery are now incorporated in WRMP19 deployable output figures and constraints.

3.5 Deployable output

The WRMP19 deployable output has been adjusted following increases to actual outputs achieved from several sources within licence during 2022 when groundwater levels were lower than average. This has led to an overall increase in deployable output of 4.82 Ml/d, to 103.94 Ml/d, which has then been reduced by 9.44 Ml/d due to longer term outages extending beyond three months; Morden Grange, Duxford Airfield and Gt Chishill were out of supply for most of the year. Two of these were as a result of raw water quality issues requiring a treatment solution and at Gt Chishill due to asset failure. We have excluded the reductions from WRMP19 in lines 8.1, 8.2 and 8.3 as the sustainability changes have not been implemented to date, and we have not observed and climate change impact on source yields. Following these adjustments, deployable output for 2023/24 is 94.50 Ml/d, 2.08 Ml/d above the WRMP19 forecast.

3.6 Water available for use

Once minor imports and exports have been accounted for 2023/24 WAFU is reported as 85.6 Ml/d, 1.86 Ml/d less than the WRMP19 Final Plan. No preferred WRMP19 options are included in deployable output as per the WRMP19 forecast

3.7 Bulk supply agreements

We have several cross-border supplies and we have not made any changes to these bulk supply arrangements during 2022/23. These supplies are not accounted for within our reported DI, adjustments are made accordingly.

3.8 Imported and exported potable water

Outturn potable water imported is 0.08 Ml/d and potable water exported is 0.54 Ml/d. These are legacy cross border supplies to and from neighbouring water companies that supply a small number of customers. None are subject to bulk supply agreements and are under standard commercial terms and consumption varies based on demands.

3.9 New appointments and variations (NAVs)

As per previous annual returns, we have included supplies for NAVs in our total DI figure, due to the overall low volumes involved of these. However, we continue to see an increase in these volumes as new NAVs are granted licences in our area, and existing developments are populated. As such, we are now monitoring these separately and can report on consumption volumes separately.

The following table outlines the existing NAVs in our area:

Table 2: NAVs in the Cambridge Water area

Site	Anticipated No. Props
Marleigh	1500
Cherry Hinton North	1200
Teversham Road, Fulbourn	110
St Neot's Road, Hardwick	175
Rampton Road, Cottenham	140
Eddeva Park	230
Babraham Road, Sawston	280
Northstowe Phase 1 (Anglian Water inset)	1500

Of these, Northstowe is the main site currently with significant occupation, with the others still in development. Our calculation of NAV supplies for 2023/24 equates to 0.38 Ml/d, and this is included in our DI in the accompanying tables, as per the guidance. We expect this value to increase each year, and we have included projections for these developments in our WRMP24 using information provided by the NAVs and their WRMPs.

We are working with the NAVs on key topics within the WRMP and we have also discussed drought plans, levels of service, water efficiency plans and messaging, joint customer communications and metering. We will continue to work with these organisations, and others that may be granted licences in our area, to ensure a consistent approach to these areas.

3.10 Impact of climate change on supply

We completed work on the impacts of climate change in preparation for WRMP19. We have made no changes to this nor to any other changes to our supply forecast. There has been no change to deployable output due to climate change, and so this has not been included in our deployable output figure.

3.11 Unbilled water

Unbilled water consists of the sum of legal and illegal unbilled water. Legal unbilled water is the volume of water used by our customers and not billed such as standpipe water use, voids with consumption and accounts held in query. Components are measured company specific estimates, this year it was 0.27 Ml/d. Illegal unbilled water is, by the very nature of this component, an estimated volume. It is generally described as water theft and covers water use which the company is not generally aware of. This year it was 0.16 Ml/d. These estimates go through an annual auditing process.

Water taken unbilled is 0.43 Ml/d compared to the forecast of 2.1 Ml/d.

3.12 Distribution system operational use (DSOU)

In 2023/24 DSOU was 0.39 Ml/d, compared to forecast of 1.0 Ml/d, this use of potable water incorporates uses from our network due to operational reasons and is not leakage or

customer use. Treatment works losses and other operational use such as raw water losses from run to waste and other operational use not recorded in distribution input at sites is 0.59 Ml/d. compared to the WRMP19 forecast of 0.16 Ml/d, which was for treatment works losses alone.

3.13 Drought Plan

Our latest drought plan was published in April 2022 and there have been no changes to this since this date. Our review of summer 2022 did not identify any changes required to the plan although we will add detail as required from the 2022 drought to the next drought plan as an additional reference drought period. This does not alter the status of the drought plan.

However, we are currently undertaking a review of our drought triggers. The outcomes of this process will identify if any changes are required to our drought plan. We will continue to engage with the Environment Agency throughout this process.

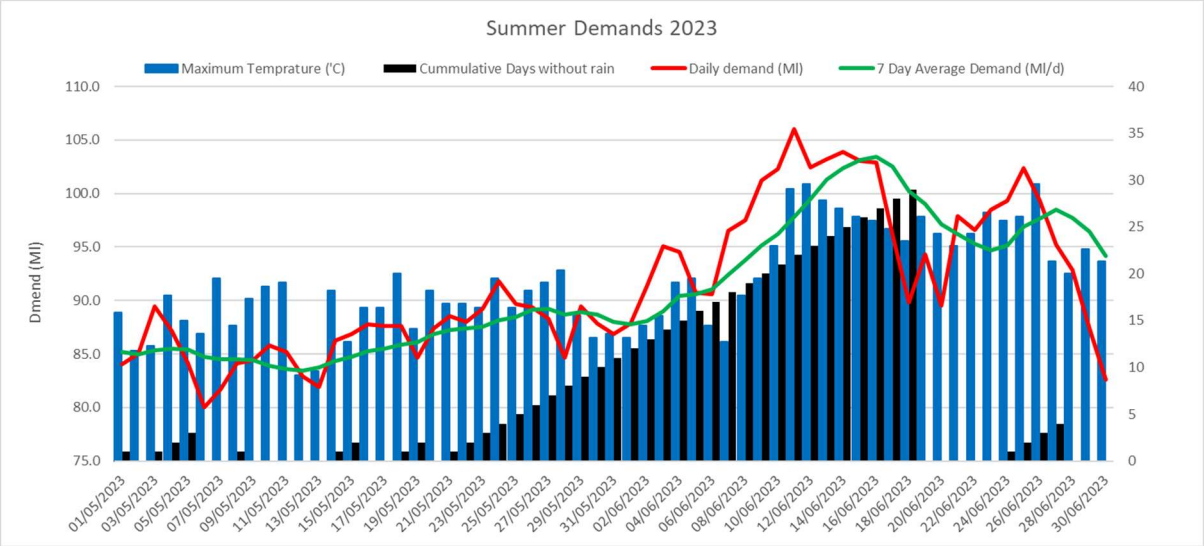
In the summer of 2024, we are expecting the publication of the guidance for the next round of drought plans. Pre-consultation on these will begin in the autumn of 2024, with draft plans submitted the following year for review and consultation.

4. Demand

4.1 Impact of weather on demand

The peak demand period in 2023/24 was seen over 10th – 16th June 2023, this was the only noteworthy weather event in the whole of Summer 2023. The peak day of 106.0 Ml/d occurred on 11th June, earlier than typical historically peak during July, it occurred during the 29 consecutive days without rain and temperatures exceeding 29°C. Average Day peak week was 103 Ml/d and occurred on 16th June, also coinciding with the dry and warm spell.

Figure 3 Summer 2023 weather vs demand



The winter of 2023/24 was also very mild, with a short cold snap where temperatures fell below freezing in late January. This led to an increase in demand of around 4 Ml/d over two days, due to a freeze thaw event that occurred around 14th/15th January.

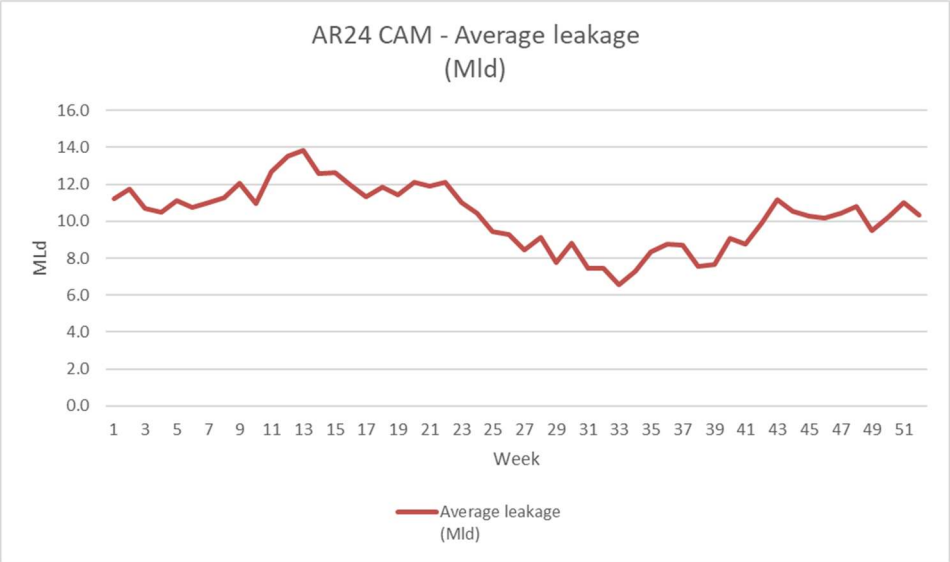
Due to the both the summer and the winter of 2023/24 being mild resulted in an average day of just less than 85.0 Ml/d, which is a decrease on the average day for 2022/23 of around 87.0Ml/d, but an increase on the average day of 2021/22 of 83.4 Ml/d.

Although 2023 was not as hot as the previous year, where we saw peaks of nearly 30% increased usage due to the heatwave, the June peaks brought an increase in summer leakage as the soil moisture deficit led to ground movements.

We also saw an increase in leakage over the winter period during the freeze thaw event in mid-January. Due to planning through weather tracking, and resource readiness, we were able to respond quickly to the increases in leakage. And as figure 4 highlights, we managed the leakage to keep the winter peaks between 10 Ml/d and 12 Ml/d in winter 2024.

The overall leakage profile for the year can be seen below:

Figure 4 CAM leakage profile for the review period (1 April 2023 to 31 March 2024)



4.2 Demand Profile

The Post MLE Distribution Input (DI) is 84.3 Ml/d excluding bulk imports and including bulk exports. The Annual Review 2023/24 DI is 2.5 M/d higher than the dry year annual average forecast in the WRMP19 of 81.8 Ml/d.

Overall Distribution Input per properties connected to supply can be seen as below. This is a consistent way of exposing the overall 'in-year' effect of all components on DI.

Table 3 DI/Property APR reported vs WRMP19 forecast

	2019/20	2020/21	2021/22	2022/23	2023/24
APR (Ml/d)	0.559	0.556	0.563	0.577	0.568
WRMP19 forecast (Ml/d)	0.561	0.550	0.539	0.529	0.520

4.2.1 Leakage

Leakage has continued to reduce over the first four years of AMP7. Although it is slightly above target for 2023/24, reporting 12.29 Ml/d vs a forecast figure of 11.5 Ml/d. As outlined in section 4.5 the WRMP19 target was set prior to the Ofwat methodology, our Ofwat target for 2023/24 was 13.51 Ml/d.

4.2.2 Per Household Consumption (PHC)

Table 4 shows the movement of Household Consumption (excluding Supply Pipe Leakage and Meter Under Registration) for the period 2019/20 (pre-covid) to AR24 (Ml/d). Showing

the effect of the Covid-19 pandemic, and the weather-related increase in household consumption. We note that two of the five years are recognised as not being Dry Years, however, in 2023/24 we achieved an outturn similar to 2019/20.

Consumption was lower in 2023/24 than the DYAA WRMP19 forecast in, 1) total household consumption, 2) measured household consumption and, 3) unmeasured household consumption.

Table 4 CAM consumption profile for the AMP to date vs. WRMP19 forecast

	2019/20	2020/21	2021/22	2022/23	2023/24	WRMP19 Forecast 2023/24
Measured Household consumption excluding SPL and MUR (Ml/d)	26.6	31.3	30.7	31.0	27.8	31.39
Unmeasured Household consumption (Ml/d)	15.7	16.3	15.7	14.3	12.7	14.73
Total Household Consumption (Ml/d)	42.2	47.6	46.4	45.3	40.5	46.12

We can see that consumption has been consistently falling since the increase seen during the Covid-19 period. With our total household PHC, 5.62 Ml/d less than the WRMP19 forecasted for 2023/24.

4.2.3 Per capita consumption (PCC)

Over the AMP we have had a significant focus on water efficiency which has supported this decrease in PCC. Alongside this we have established an internal stakeholder water balance working group, and a consumption monitor working group. These working groups continually assess the system billing and maintenance reports and have completed a deep dive on the billing reports to produce better data and information. During this year the working groups will continue to carryout assurance of the billing files and critical system files.

The per capita consumptions below compare the period 2019/20 to 2023/24 as 'in year' outturns vs WRMP19 DYAA. Again, there is a consistent downward trend since the Covid-19 period.

Table 5 CAM per capita consumption profile for the AMP to date vs. WRMP19

	2019/20	2020/21	2021/22	2022/23	2023/24	WRMP19 Forecast 2023/24
Household measured (l/h/d)	118.25	141.13	132.31	129.02	111.98	120.5
Household unmeasured (l/h/d)	161.99	174.65	163.32	154.86	141.08	172.3
Total household (l/h/d)	131.19	150.76	141.03	135.89	119.40	133.3

Section 4.3 details our water efficiency activity in year five that has helped deliver this reduction, as well as how we plan to build on this for year five to continue our progress in this area and deliver further reductions to PCC.

We continue to maintain the 'new' unmeasured household consumption monitor. APR24 is the fourth year from which the unmeasured PCC estimate has been derived. The process continues to be peer reviewed by Artesia and part of the Company's assurance commitment.

We extract household consumption from our new billing system that we installed in 2023 called Aptumo. Meters are read once a year and billed twice yearly, with the second bill being based on an estimated reading. A significant amount of data validation has been undertaken during 2023/24 leading to the billing file maintenance and data quality being improved. We will continue this in the forthcoming year.

We have invested in the water balance throughout AMP7 and 2023/24. Investment has been made in our household consumption monitors, night use monitors, measured non-household consumption analysis, and water balance component studies. Using the water balance working group, and billing consumption working group, to internally challenge and review our processes.

We are pleased that the focussed effort has resulted in a reduction in PCC, as outlined above in table 5.

4.2.4 Non-Household Consumption

Since 'Open Water' came into force in 2017, non-household customers have had the choice of selecting their own retail billing company. As a result we now access meter reading and consumption data via the 'Central Market Operating System' (CMOS), with a monthly report generated from merging the CMOS consumption reports with our own consumptions reports. The water balance working group has worked with our retail helpdesk to continue to improve the consumption data we receive.

Our measured non-household in 2023/24 was 27.8Ml/d, which is higher than the WRMP19 forecast of 20.48 Ml/d. To understand this further, in the past year we have completed a deep dive on the various categories of non-household consumption, which included more accurate review of the in-year Legacy Long Unread Meters and Long Unread Meters. This has included additional meter readings and review on our logged data records to calculate an average daily consumption (ADC), rather than the historic established method of allocating a standard ADC. We have also reviewed and adjusted consumption records we have received from the Retail Market through CMOS to address identified inaccuracies in non-household consumption. This has included where groups of properties or meters have been incorrectly allocated on reports.

As part of the water balance process we have got the Aptumo Billing Team to conduct more frequent file maintenance, and set up more rules in the systemised consumption report process to identify and remove erroneous customer readings. This is the first year we've had

a full billing period with the Aptumo system and removal of readings was previously completed in a manual way. The processes have been audited as part of the Annual Performance Review and we received full support. Going forward we will continue to complete these activities.

4.2.5 Development

There has been sustained growth in the Cambridge region due to development above the national average for several years.

4.2.6 Demand forecast, including population and properties

We comprehensively revise our demand forecasts every five years. We commissioned Artesia Consulting to carry out this work for both our WRMP19 and WRMP24 which has updated population, properties and forecast consumptions for the planning period

This has provided stability and consistency for the demand side of the WRMP processes.

4.3 Demand forecast, including population and property forecasting

We have updated our property and population growth forecasts as part of our WRMP24 development. We have made no changes to our WRMP19 assumptions.

4.4 Water efficiency

We have continued with our BAU water efficiency activities. These include:

- Use of Get Water Get Fit – online and virtual customer water efficiency audits and provision of water saving devices.
- Water efficiency messaging with social media and our website.
- Engagement at local community events promoting metering and sharing water efficiency advice and products.
- Direct engagement with our customers through our new “Water on Wheels” mobile role - sharing metering and water saving advice, as well as support for vulnerable customers.
- Offering of incentives to Developers for water efficient house building.

During 2023/24 the Company has distributed over 5,126 water saving devices in the Cambridge region saving circa 0.32 Ml/d.

As a result of the Covid-19 pandemic, we saw customer use over 10 l/p/d more water. We developed a detailed PCC reduction plan, and as a result have seen PCC reduce substantially and consistently since the pandemic, and at the end of 2022/23, we had reduced PCC down to only 1 l/p/d above the WRMP19 target for that year.

We have continued with our PCC plan throughout 2023/24, increasing our funding for water efficiency work by over 30%. In addition to the BAU activities outlined above, we have delivered three notable schemes outlined below.

4.4.1 Data Demand Sprint

We held two open data demand sprints in 2023, involving internal colleagues and external organisations. The theme of the sprint was 'Future proofing Cambridge: How to solve a future water challenge'. Six teams with diverse skill sets were provided with a number of internal and external data sets. They crunched the data to understand high-consumption drivers and brainstormed initiatives and interventions for the reduction of usage. Teams presented their findings to the judging panel with prizes awarded to the winning group.

The aim of the sprint was to explore the opportunities through open data and benefit from additional data insight to support the PCC programme. We were presented with some great insights and ideas on demand reduction initiatives from our staff and data specialists, elements of which we have incorporated in our ongoing campaigns for year 5. We propose to do future events in other areas too, such as water quality.

4.4.2 Water Efficiency in Faith & Diverse Communities

In May 2023, we were awarded £270,000 from Ofwat's Innovation Fund for a diversity-led water efficiency project. The aim of this project is to better understand how water is used and valued in different faiths and cultures within the communities we serve.

The project involve us working with faith groups, experts and a range of organisations supported by academic research led by the University of Cambridge – Faculty of divinity providing insight into the relationship with water and faith, practical uses of water and some of the barriers and opportunities to better engage diverse communities.

This research will enable us to develop more effective water efficiency measures, behaviour change campaigns and bespoke water-saving products to support customers of different faiths and cultures to reduce their water use and build public trust.

We think the project will deliver a number of key objectives for us, including water savings of around 200,000 litres and enable us to develop a more inclusive water efficiency framework and toolkit linked to faith and culture that can be adapted and scaled up across the sector. And we think it will help us to establish new channels of communication and stakeholder relationships with our hard-to-reach communities.

Between July and November 2023, the University of Cambridge carried out research in the local area as part of the 18-month project. The aim was to learn about how religious communities in Cambridge use and value water, and about community needs in terms of water and sustainability. The ultimate goal of this work has been to explore new possibilities for water conservation and sustainability practices that are inspired by and/or speak to religious ways of being.

In January 2024 the report was published and can be found here: https://www.interfaith.cam.ac.uk/system/files/cip_report_badder_2023_water_and-in_religious_relations_web.pdf.

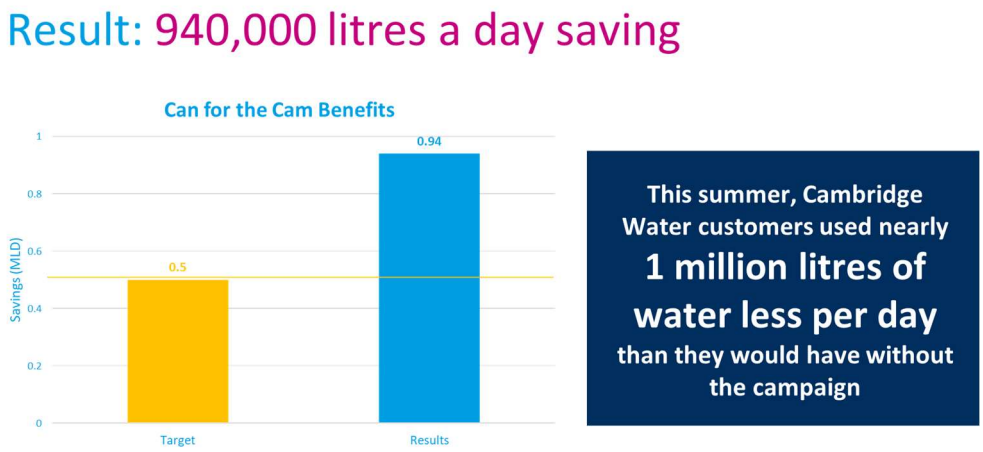
In March 2024, we launched our first campaign for the project in partnership with Cambridge Central Mosque. This focused on the opportunity to save water during the Islamic practice of Wudu (ablution), the ritual washing performed in preparation for prayer and worship. We are planning other campaigns moving into our South Staffs region and will report on these in next year's annual report and financial statements.

4.4.3 Can for the Cam Behavioural Change Campaign

In 2023 we undertook a behavioural change campaign over the summer period, "Can for the Cam", to encourage customers to "ditch the hose" and switch to using a watering can instead in order to protect the river Cam.

Our target was to reduce the summer water-use peak which is in large part due to garden use and as 91% of Cambridgeshire households have a garden, this campaign was designed to reach all of our customer base through the customer touchpoints displayed below.

Our campaign was overwhelmingly successful and delivered nearly double the reduction in water we have targeted.



4.4.4 Water Scarcity Group

In 2023 the Water Scarcity Group set up by Government to unlock the current blocked growth in Cambridge resulting from concerns around the sustainability of supplying these, as well as looking at how to enable the Government's long term development aims for the area as outline in the Case for Cambridge[1]. We are an active partner in this group which is looking at the opportunities to unblock and enable growth in the city through delivery of a range of interventions that reduce the demand for water as well as potentially increase the availability of water supply.

[1] The Case for Cambridge - GOV.UK (www.gov.uk)

One key area of this looks at retrofitting of both domestic and non-household properties, initially examples include schools which have high water usage, to deliver higher levels of water efficiency. We are supporting the delivery of this work through our engagement with customers, enabling delivery under our proposed "Yes we Cam" behavioural change campaign (see section 4.5.5.), identification of suitable properties, and monitoring outputs.

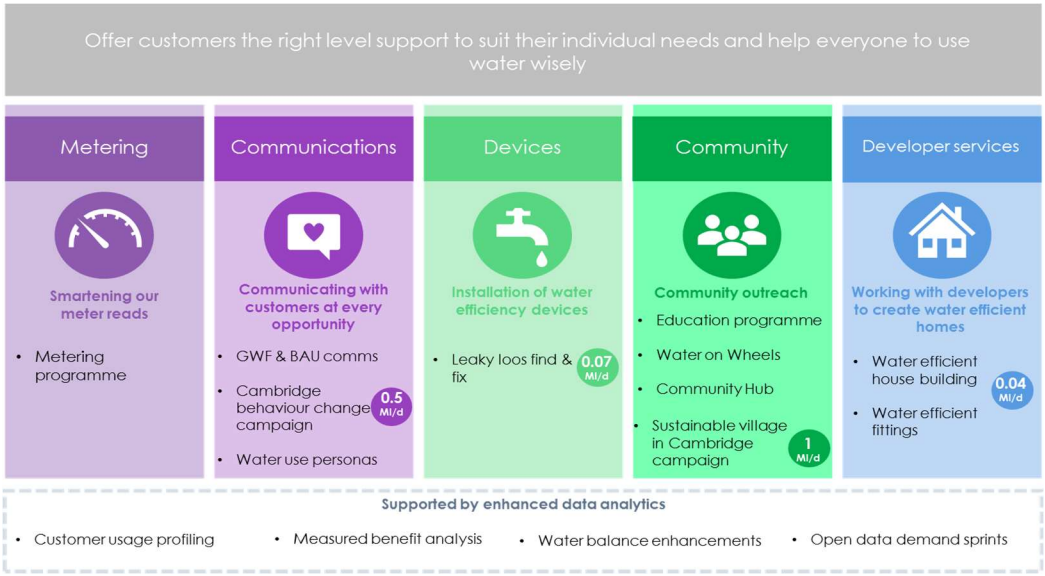
In addition, 2024 will see a trial of a water credits scheme where developers will fund demand offsetting activity through the purchase of credits which will then deliver initiatives such as greywater reuse systems, rainwater harvesting systems and retrofitting on existing properties. This will enable new developments to significantly lower their water footprint and potentially achieve water neutrality, and therefore support sustainable growth in the region that does not have a negative environmental impact. We are part of this delivery group and will continue to support this initiative through 2024 and beyond.

We have also input to the development of consultations on policy and legislation on reuse schemes and housebuilding water efficiency standards.

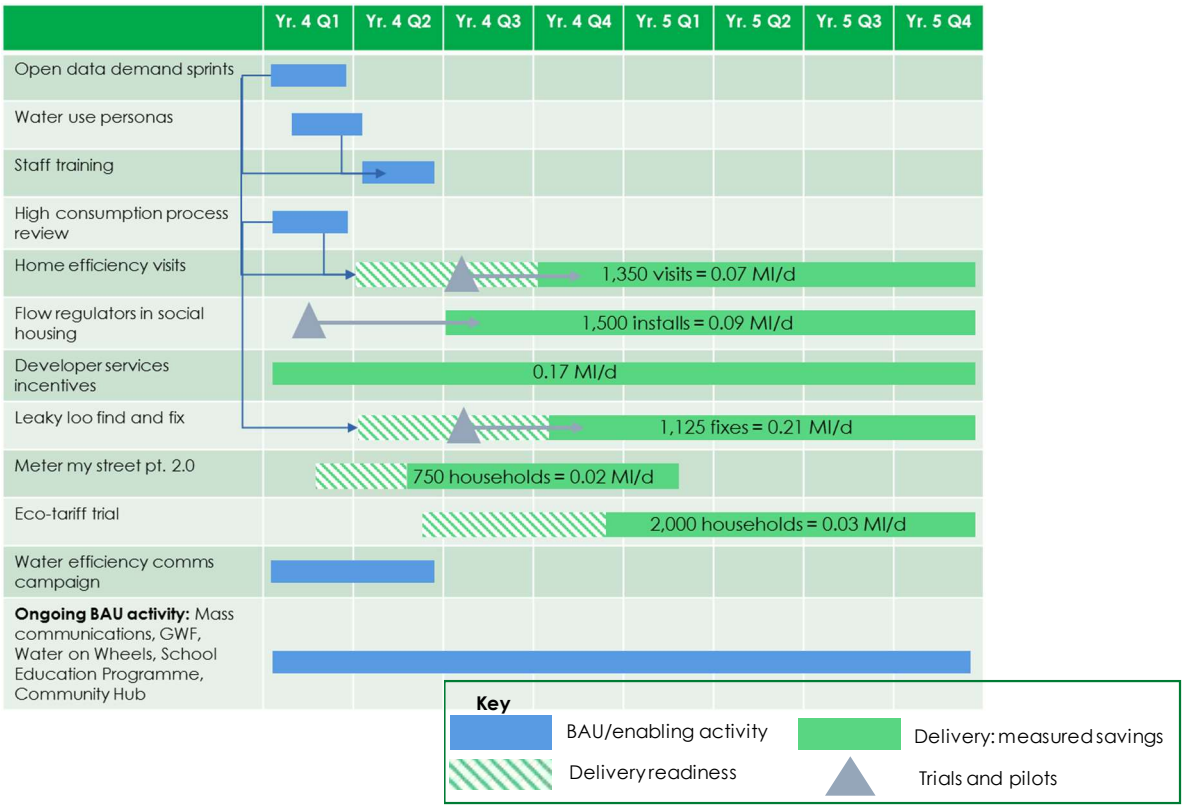
As a result, we have updated our water efficiency plan for year 5 to align with this activity and we outline this in the section below.

4.4.5 Year 5 Water Efficiency Plan

At the last annual review, we shared the below plan for Cambridge for AMP7:



The diagram below shows the timelines we developed for this activity:



Following the success of our Can for the Cam behavioural change campaign, through discussions with Defra and the Water Scarcity Group, we have revisited the year 5 programme to build on these outcomes.

This means we will be undertaking a second, larger, behavioural change campaign in year 5 as opposed to the sustainable village scheme. This campaign will become the umbrella campaign for Cambridge, with workstreams of individual activities and campaigns underneath, including the Can for the Cam and Water in Faith Communities campaigns. This will ensure customers can easily understand the connection between these initiatives and we have a consistent message and logo running through our customer messaging.

This campaign will be called “Yes we Cam!” and builds on our “Can for the Cam” messaging last year. Our post campaign research told us that customers resonate with the connection to the Cam, and how important it is to the residents of Cambridge, and so we aim to create a collective action approach to protecting this river, and other chalk streams.

As part of this campaign, we will be asking customers to take a pledge to undertake a particular element of water saving activity. One key area we will promote is leaky loos, showing customers how to identify if they have one, asking them to report them to us and then employing a plumber to visit these customers and fix them, making an assessment of the size of the leak each time and therefore the amount of water saved by the fix. The plumber will also be able to fit water efficient devices whilst in the home. This means we’re combining the leaky loo and home efficiency visit activity workstream in our original plan

into this campaign to increase efficiency, improve the journey for our customers and maximise the benefits.

The below images show some of our potential design work for the Yes we Can campaign.

Other key activities in the campaign will include:

- Door knocking to encourage customers to make a pledge.
- Trial of Wizso tablets with customers – added to urine in the toilet it neutralises the colour and smell meaning no flush required and saving water.
- Development of complimentary material for school visits, assemblies and educational events.
- Out of home advertising, including at leisure centres, health clubs and shopping centres. Roadside advertising, bus advertising, and ad bike riding around Cambridge and parking at key locations.
- Radio sponsorship and ads, social media.
- Launch event.
- Development of separate website, including area for customers to report leaky loos to us.

4.4.6 Non household consumption reduction

Our WRMP19 does not include any non-household reduction activity; however, we recognise this is an important area for consumption reduction and whilst our WRMP24 includes activities in this area from 2025. We believed it was important to start work before that to support the challenges we are experiencing in Cambridge, and so have been developing some collaborative approaches and initiatives.

We have developed an innovative partnership with Whitbread. This partnership will see us jointly deliver water savings across the Premier Inns and restaurants across the

Cambridge region in 2024 by retrofitting properties with water efficient devices such as installation of upgraded WC valves, water-efficient showerheads, and flow restricted taps. We have also been successful in another Ofwat Innovation Fund bid, joint with Severn Trent Water, to look at reducing consumption through incentivisation using Nectar points. This programme will trial in the Severn Trent/South Staffs Water area, with learnings that can be shared across the Cambridge region.

We have also engaged with Addenbrookes hospital to support them in developing a consumption reduction plan. This involves water audits, leaky loo reviews, identifying opportunities for water reuse, and we will take our Yes We Cam campaign into the hospital to help influence staff and patient behaviour. We will continue to work together on this and look at an approach we can roll out across other hospitals.

4.5 Metering

We have continued to see customers requesting a meter to be lower than forecast. Our WRMP19 strategy was for optants to increase our penetration. Covid-19 impacted on this as customers were unable to have meters fitted and had focus elsewhere. Following this, customers have told us that the cost-of-living crisis is still a primary concern, and they do not wish to risk changes to their bill profile as many fear rises and prefer a predictable bill which does not fluctuate, as seen on rateable values. These two events are outside of our control and have meant that we have seen less optants, and therefore a lower meter penetration than predicted.

We acknowledge that there are water saving benefits associated with metering, and that a change of strategy would be required if we are to achieve the metering penetration forecast in WRMP19. We developed a catch-up plan, shared in last year's review, and we discuss this in section 4.4.1 below.

Households are entitled to a free meter installation and can switch back to being charged on an unmeasured basis at any time within two years of choosing to have a meter fitted. Our customers supported this non-compulsory approach to metering during the consultation period for our AMP6 and AMP7 business plans. We have reviewed this as we have developed our WRMP24 draft plan following the classification of the Cambridge Water area as water stressed, and the continued high demand in our area post Covid-19. We have also engaged with our customers on their views of compulsory metering and smart metering. As such, our WRMP24 draft plan proposes to deliver universal metering by 2035. All new meters fitted with be smart meters.

In 2023/24, 1,346 unmeasured households in the Cambridge region switched to a meter, and installed 14 new meters to previously unmetered non-household premises. We have also had 1,201 new connections, both domestic and non-household, to our network which all have meters fitted.

As such, the year-end total meter penetration for 2023/24 is 73.62%. This compares to 2022/23 meter penetration (including voids) of 73.37%.

We continued to renew household meter connections during the review year and have seen a significant uplift in the number of meter replacements required due to increased focus on meter data. As a result we have replaced 3,130 meters in 2023/24, which is an uplift of nearly 40% compared to 2022/23. We have also replaced 57 non-household meters.

We also continue to undertake annual MUR surveys of our meter stock. This is compliant with Ofwat consistency guidance and follows industry best practice.

4.5.1 Metering Action Plan

As outlined above, we are behind our AMP7 projected position due to the Covid-19 impacting our ability to attend customer properties to install meters, and the cost-of-living crisis making customers reluctant to switch to a meter leading to an overall reduction in requests. Our WRMP19 meter penetration forecast was 78%, compared to our actual position of 73.62%.

Our existing metering improvement plans worked to provide more information to customers around metering, highlighting the benefits, both financial and environmental, and the protection offered (they can switch back within the first two years) and also educating customers on why we should reduce water consumption.

The cost-of-living crisis and ongoing uncertainty has meant this hasn't yielded the results desired, and so we proposed a plan to undertake an extensive programme in 2024/25 to catch up this backlog of meter installations by fitting "ghost" meters – this is where we install meters but do not immediately charge the customer based on the meter consumption.

However, this plan meant that we would not switch customers to metered bills during AMP7, and therefore these would not be counted in our metering penetration figures as these numbers must be properties billed by a meter. We have therefore reviewed the suitability of this approach and determined that we will not be undertaking the original catch up programme as planned, although we do plan to still fit circa 3,500 ghost meters in this way in preparation for AMP8 and to help us gain feedback from customers on the switching process.

The other option would be to install meters in a similar way, but switch customers in year to a bill, essentially compulsory metering. Following subsequent customer engagement, we are not proposing to install compulsory metering in year 5 of AMP7 as we will not have the time to engage with our customers appropriately to make them aware of the approach, why we're doing it, what it will mean for them and the support we can offer. We believe that rushing into a compulsory metering programme will cause significant worry and distress for a substantial proportion of our customers, and therefore we will not be progressing with this approach either.

We acknowledge that this means we will not meet our AMP7 projected metering position; however, we believe that our optant strategy was a forecast of the number of customers who we believed would request a meter and our influence over this is limited. The world

events detailed above are out of our control and have had the most significant impact on the number of customers requesting a meter. We propose to deliver a catch-up programme in year 1 of AMP8 when we will be undertaking our compulsory universal metering programme. As such, it will not impact on our WRMP24 approach or supply demand balance and will ensure we deliver the projected metering penetration in early AMP8.

We had previously detailed how we had applied for the Defra accelerated spend for metering; we obviously cannot accelerate activity until our baseline delivery has been achieved, and therefore there will be no acceleration of metering in AMP7.

4.6 Leakage

Total leakage in 2023/24 is 12.29 Ml/d. This relates to our Ofwat target of 13.51 Ml/d.

Since April 2022 we have undertaken an increased amount of work on all 4 aspects of PALM (Prevent, Aware, Locate, Mend) in order to continue to maintain and further reduce leakage. For all 4 aspects these include but are not limited to:

Prevent:

- Undertaken a pressure management study completed by an external company.
- Examining optimisation opportunities with our current pressure management and new pressure management opportunities.
- Built 5 new DMA pressure management schemes.

Aware:

- Recruited 2x new leakage analysts
- Invested in and trialling SMEs tool “Paradigm” – A forecasting model for our DMAs to give us a detailed demand breakdown for hydraulic areas and the ability to predict consumptions and expected burst flows.
- Undertaken 3 different network wide satellite surveys during this period to help us find hidden leaks on our network
- Developed a lift and shift Acoustic logger program and purchasing the latest Acoustic lift and shift and permanent loggers
    - ~700 lift and shift loggers
    - ~1350 new Permanent Acoustic Loggers, with all fitting to be completed by end of June 2024

Locate:

- Expanded Internal Leakage Technician Resource from 34 to 43 FTE (20% increase)
- Recruited 7 external logging resource FTE
- Employed an external contractor (4 FTE) to undertake our satellite survey follow ups.
- Employed an external contractor to undertake intensive Trunk Main Leakage investigations on our network (2/3 FTE)
- Continuing to expand our “find” equipment and innovative solutions.

Mend:

- Increased number of repair teams from 16 to 20 (~20% increase)
- Implemented an in-house Customer Works Team to enable us follow up on CSLs quicker and more efficiently and get them repaired in a timely manner. Since implementation we have seen a huge improvement in CSL run times

We continue to calculate bottom-up leakage using data obtained from DMAs, which monitor an area of approximately 1,000 to 2,000 properties. We provide further details of our 2023/24 leakage and PCC performance in the annual performance report (APR) that we will submit to Ofwat in July 2024.

4.7 Consistency in reporting methodology

We achieved full compliance in 2023/24 for per capita consumption in both regions.

5. Headroom and options

5.1 Target headroom

We update our target headroom every five years as part of the WRMP process. We commissioned Mott Macdonald to do this work for our WRMP19. We have not made any changes to this since publishing our WRMP19.

We have included the WRMP19 target headroom in our supporting data tables for this submission. However, it should be noted that headroom relates to uncertainty, and as the year has now passed, some of those uncertainties are resolved e.g.

- Climate change impacts on supply (S8) and demand (D3) (equates to 0.07 Ml/d)
- S5 – gradual groundwater pollution impacts to DO
- D2 – demand forecast uncertainty

With these elements removed, this equates to a reduction of 42% in target headroom, and so we have updated our target headroom in the accompanying data tables to 1.39 Ml/d compared to the WRMP19 value of 2.39 Ml/d.

5.2 Selected options

Our WRMP19 outlined the need to reintroduce three mothballed borehole sites as outlined below:

- Croydon - required to maintain supply/demand balance
- Kingston –to support operational resilience
- St Ives – to support operational resilience

Our investigations earlier in the AMP reduced the potential benefits from these schemes from 3.92 Ml/d to 3.43 Ml/d due to revised information on water framework directive (WFD) no deterioration requirements and licence reductions. WRMP19 forecasts all sites to be delivered by end of AMP7 2024/25.

Croydon is currently under development and will be completed by the end of AMP7 as forecast. This will deliver circa 1.4Ml/d at annual average, reducing to 1.01Ml/d in 2030 following revised licence cap values for preventing deterioration. Croydon has been prioritised due to its requirement for improvement to the supply demand balance.

We are currently undertaking detailed feasibility studies at both Kingston and St Ives, with a view for completing delivery of these schemes by the end of year 1 of AMP8. Delays to this have been caused by the need to revisit the feasibility and solution development work at Kingston based on the changes to licence caps proposed post WRMP19 during AMP7, and improvement in understanding of the water availability at St Ives. In addition, the small yield

potential at Kingston is making identifying a cost-effective solution challenging and we need to assess whether this is most appropriate way to provide 0.9 Ml/d.

As a result of these delays, we have increased our spend on both leakage and household water efficiency activity in year 4 and 5 to deliver the benefits outlined. We have discussed these demand-side options in Section 4 above.

WRMP19 target position for PCC at the end of 2023/24 was 133.3 l/p/d. Our actual outturn is 119 l/p/d. Based on the population, this means household consumption is 4.65 Ml/d lower than our plan.

Our leakage number has been adjusted post WRMP19 publication due to the change in methodology, and as a result our leakage target position for this year is 13.51 Ml/d. Our actual outturn is 12.29 Ml/d which is 1.22 Ml/d lower than target.

We have seen NHH consumption be higher than forecast, and this is why we are now looking to undertake work in this area in AMP7, which was not a part of our WRMP19 plan for AMP7. We will continue to invest increased levels of spend in all three of these areas in year 5 of AMP7 to offset the delays to Kingston and St Ives.

Whilst the above demonstrates movement between the components that make up our DI, our current DI is within our WRMP24 forecast position and therefore these variances do not pose a risk to our starting position.

5.3 Supply-demand balance

We have a supply demand balance for 2023/24 of -0.52 Ml/d compared to the forecast of 2.71 Ml/d for a dry year. Whilst we were able to increase our stated deployable output following additional gains achieved during 2022 at sources following capital works, there was a reduction to deployable output due to longer term outages for water quality reasons. These were in part due to the wetter than normal winter increasing nitrates above acceptable levels at two sources.

6. Forward look

2023/24 has seen us deliver strong performance in key areas such as household consumption and leakage. Our plans for year five of AMP7 build on these successes as we drive to deliver even more benefits in these areas.

Additional areas of focus for us include outage and asset availability. The winter of 2023/24 has seen record levels of rainfall, and this has impacted on the raw water quality we are experiencing at several of our borehole sites. We have seen some significant increases in nitrate levels, with sites such as Morden Grange and Melbourn out of supply for prolonged periods of time. As a result, we have already been reviewing our proposed investment schemes for AMP8 to ensure we prioritise this newly emerging issue, developing new proposals to ensure we can reduce the risks and improve the resilience of multiple sites.

Despite these challenges, we have continued to ensure that all our customers have a secure supply of high-quality water and that this is provided in an environmentally sustainable way. In 2022/23, we had an over-abstraction incident following the drought over the summer of 2022 and then freeze thaw events we experience in the winter. As a result, we overhauled our licence monitoring approach and system, as well as many of our processes relating to decision making. As a result, we were compliant with all of our abstraction licences in 2023/24, and we are building on this further in year five to further refine the new monitoring tool we have developed and provide additional business wide awareness activities and training. This is an area we take extremely seriously and are committed to delivering compliance and protecting the environment.

There are developments in the Cambridge region that are currently held in the planning system due to concerns about the impacts the increase in demand might have on the environment. As such, the Government has created the Water Scarcity Group, and we are an active member of this group. We are committed to maximising the activity we can undertake to reduce demand across the region, and have committed additional spend to leakage, household and non-household water efficiency programmes to this end. The delivery of these programmes, and our continued collaboration with and support of the Water Scarcity Group is a key focus for us in year five.

We are keen to support sustainable development and will continue to offer our developer incentives to build more water efficient developments and continue our discussions with developers to encourage and support site wide water recycling schemes. We will also continue to work with Defra on the changes required to building standards and to enable more water recycling schemes to be developed. Will are also continuing our work with WRE to identify how to meet the Government's proposed Case for Cambridge development plan sustainably.

We will build on the successes we have achieved in both leakage and household water efficiency and are excited to deliver our "Yes We Cam" behavioural change campaign. We believe this campaign can also be a delivery vehicle for the Defra led Water Scarcity Group retrofit work this year, and we will continue our collaboration with Defra and DLUHC to

ensure these schemes are successful. We are also committed to sharing the outputs and learnings of the ongoing work in Cambridge across the industry, and we have commenced this through our involvement and leadership in various groups such as Water UKs Supply Strategy Group, CCW's Leading the Way task and finish Group, and Waterwise's Water Efficiency Forum.

We have submitted our revised WRMP24 and are awaiting direction from the Secretary of State regarding publication of this. Due to the general election on 4th July, it will be autumn before we receive direction on this. This will enable us to incorporate the additional activities we have been undertaking regarding feasibility of delivering the Fenstanton supply side option in AMP8 and the updated modelling work that will impact on the sustainability reductions required in AMP8.

We will continue to work with all sectors in the region and with groups like Water Resources East (WRE) to ensure abstraction is sustainable and meets the needs of water users and the environment in the east of England. We continue working with Anglian Water to develop our future preferred supply schemes of the Grafham Transfer and the Fens Reservoir. We are leading a multi-company working group on the Grafham Transfer to ensure the Severn Trent Water and Affinity Water precursory schemes are aligned and any risks to delivery are identified early and mitigation is developed.

We have submitted our draft business plan, PR24, to Ofwat and await the draft determination on this in early July. We will provide our response and representation on this, with the final determination due in December 2024. We will ensure any potential impacts on the WRMP24 are reflected accordingly.

6.1 Preparing for AMP8

We are mindful that the next WRMP for our Cambridge region will need to deliver a sustainable abstraction framework from the chalk aquifers despite an increasing population and an unstable climate. In the future, alongside further demand management and leakage reduction, we will need new supplies to meet further growth. We are conscious that this need could well be triggered sooner if the rate of expected growth increases. We have published our draft WRMP24 which addresses these issues and await direction from the Secretary of State to publish as a final version.

We are working with all sectors in the region, with Resources East (WRE) and RAPID to ensure abstraction is sustainable and meets the needs of water users and the environment into the future, and have made a commitment to complete further supporting work to the WRMP for ensuring growth does not pose a risk to the environment.