Albion Water Limited

(Post Consultation)

Water Resources Management Plan

June 2023

Date	June 2023
Prepared	Shaun Jones Head of Regulatory Compliance
Approved on behalf of the Board	Adam Shore Acting Managing Director

Contents

1 Introduction

Our Water Resource Management Plan (WRMP) sets out how we intend to achieve a secure and sustainable supply of wholesome drinking water for our customers, whilst protecting and enhancing our environment at the same time.

Each plan is prepared every five years and forecasts the security of our drinking water supplies over a twenty-five-year period with reviews carried out every year to ensure adaptable changes can be made dynamically.

Plans must comply with all the relevant Statutory requirements and Directions which articulate government policy. They are therefore subject to review and assessment by our Regulators such as the Environment Agency (EA); Office of Water Services (Ofwat); Department for Environment, Food, and Rural Affairs (Defra); and the Drinking Water Inspectorate (DWI).

This version of our plan is the post consultation version, updated along side the provision of a statement of response to those points raised amongst consultees, including regulators.

1.1 Albion Water

Licensed by the Office of Water Services (Ofwat) in 1999, through the New Appointment and Variation (NAV) process, Albion Water was the first new water company with the same powers and responsibilities as any other incumbent water company in England and Wales.

We provide drinking water and sewage services to customers located in Gloucester (Upper Rissington), Essex (Oaklands Hamlet), together with Hampshire and Kent where we operate sewage only services.

Since our last WRMP the ownership of Albion Water has changed from Wessex Water to the Sustainable Drainage Systems Group. Whilst this has caused a change in our leadership team and strategic direction, the delivery of drinking water and sewage services to our customers continues unaffected. However, the new owners of Albion Water, are looking more closely at the work we carryout to make sure we meet our regulatory duties, improve customer service and achieve better environmental outcomes by implementing innovative solutions already deployed by the wider group.

We've already invested a lot of time and effort improving the data and information to better report facts and figures relevant to this report and this is one of the reasons why some of the detail as drafted has changed so much in the intervening period since our draft version.

1.1 Bulk Supply Agreements

Upper Rissington, Gloucester – Thames Water – Agreed 28th June 2023
Oaklands Hamlet, Chigwell – Essex and Suffolk Water – Agreed 17th February 2022

SECTION 1

Legal Requirements (Directions)

2 Legal Compliance

Water Resource Management Plans must comply with the Water Resource Management Plan (England) Direction 2022 in order to comply with the requirements of Sections 37A - 37D Water Industry Act 1991.

Each of the Directions is listed in the table below, which includes commentary and references to the relevant parts of our plan to demonstrate compliance.

Table 1: The Water Resources Management Plan (England) Direction 2022

Regulation	Requirement	Corresponding Plan
Planning period of water resources management plan		
2.—(1)	Other than Southern Water Services Limited, a water undertaker must prepare a water resources management plan for a period of at least 25 years commencing on 1st April 2025.	Our Water Resources Management Plan is in preparation for commencement 1st April 2025
Matters to be addressed in a water resources management plan		
3.—(1)	In accordance with section 37A(3)(d), a water undertaker must include in its water resources management plan a description of the following matters—	We provide the following references to the relevant parts of our plan to demonstrate compliance with this requirement.
(a)	the appraisal methodologies which it used in choosing the measures which it has identified in accordance with section 37A(3)(b) and its reasons for choosing those measures;	Annex 1 and 2
(b)	for the first 25 years of the planning period, its estimate of the average annual risk, expressed as a percentage, that it may need to impose prohibitions or restrictions on its customers in relation to the use of water under each of the following—	These are provided in the following sections and mirror those of the incumbent water companies: 3.1 Levels of Service 4.3.6 Upper Rissington 5.3.6 Oaklands Hamlet
(i)	section 76(b);	
(ii)	section 74(2)(b) of the Water Resources Act 1991(c); and	
(iii)	section 75 of the Water Resources Act 1991, and how it expects the annual risk that it may need to impose prohibitions or restrictions on its customers under each of those provisions to change over the course of the	4.3.6 (Rissington) 5.3.6 (Oaklands)

	planning period as a result of the measures which it has identified in accordance with section 37A(3)(b);	
(c)	the assumptions it has made to determine the estimates of risks under sub-paragraph (b), including but not limited to drought severity;	We adopt the incumbents estimates of risk
(d)	in respect of greenhouse gas emissions—	See Section 9.1
(i)	the emissions of greenhouse gases which are likely to arise as a result of each measure which it has identified in accordance with section 37A(3)(b), unless that information has been reported and published elsewhere and the water resources management plan states where that information is available;	See Section 9.1
(ii)	how those greenhouse gas emissions will contribute individually and collectively to its greenhouse gas emissions overall;	See Section 9.1
(iii)	any steps it intends to take to reduce those greenhouse gas emissions;	See Section 9.1
(iv)	how these steps will support the delivery of any net zero greenhouse gas emissions commitment made by it; and	See Section 9.1
(v)	how these steps will support delivery of the UK government's net zero greenhouse gas emissions targets and commitments.	See Section 9.1
(e)	the assumptions it has made as part of the supply and demand forecasts contained in the water resources management plan in respect of—	Section 7 - Updated to meet requirements set out in permission to publish
(i)	the implications of climate change, including in relation to the impact on supply and demand of each measure which it has identified in accordance with section 37A(3)(b);	See Section 7
(ii)	household demand in its area, including in relation to population	See Section 7

	and housing numbers, except where it does not supply, and will continue not to supply, water to domestic premises; and	
(iii)	non-household demand in its area, except where it does not supply, and will continue not to supply, water to non-domestic premises or to an acquiring licensee;	See Section 7
(f)	its intended programme for the implementation of domestic metering including—	4.9.3 Rissington 5.3 Oaklands
(i)	the proportion of smart meters to other meters;	4.7 Rissington 5.7 Oaklands
(ii)	if it does not intend to install smart meters, the reasons for this;	Annex 1 and 2
(iii)	its estimate of the cost of that programme, including the costs of installation and operation of meters;	Annex 1
(h)	its estimate of the total number of domestic premises which will become subject to domestic metering during the planning period and including a breakdown of—	4.7 Table 3 (Rissington)
(i)	the number of domestic premises with smart meters;	4.7 Rissington 5.7 Oaklands
(ii)	the number of domestic premises with meters that will not be charged by reference to volume;	4.7 Rissington 5.7 Oaklands
(iii)	the number of domestic premises with meters that will be charged by reference to volume including—	4.7 Rissington 5.7 Oaklands
(aa)	optant metering;	4.7 Rissington 5.7 Oaklands
(bb)	change of occupancy metering;	4.7 Rissington 5.7 Oaklands
(cc)	new build metering;	4.7 Rissington 5.7 Oaklands
(dd)	compulsory metering; and	4.7 Rissington 5.7 Oaklands
(ee)	selective metering;	4.7 Rissington 5.7 Oaklands
(i)	its estimate of the impact on demand for water in its area of any increase in the number of	Annex 1 and 2

	premises subject to domestic metering;	
(j)	its assessment of the cost-effectiveness of domestic metering as a mechanism for reducing demand for water by comparison with other measures which it might take to meet its obligations under Part III of the Act;	Annex 1 and 2
(k)	its intended programme to manage and reduce leakage, including anticipated leakage levels and how those levels have been determined;	4.9.2 Leakage Rissington 5.9.2 Leakage Oaklands 10 Company Level Leakage
(l)	if leakage levels are expected to increase at any time during the planning period, why any increase is expected and if so, the proposed plan of works that will be undertaken to mitigate this;	Its not expected to increase
(m)	how its intended programme to manage and reduce leakage will contribute to—	4.13 tackling Leakage Rissington 5.3 Tackling Leakage Oaklands 10 Company Level Leakage
(i)	a reduction in leakage by 50% from 2017/18 levels by 2050; and	4.9.2 Leakage Rissington 5.9.2 Leakage Oaklands 10 Company Level Leakage
(ii)	any leakage reduction commitment it has made in respect of its appointment area;	4.9.2 Leakage Rissington 5.9.2 Leakage Oaklands 10 Company Level Leakage
(n)	In respect of any relevant regional water resources plan—	Section 7 - Updated to meet requirements set out in permission to publish
(i)	how this plan has been considered and reflected in its water resources management plan; or	We've met with Regional Planning Groups 9.2 Regional Plans
(ii)	where the plan has not been considered and reflected in its water resources management plan, the reasons for this.	Regional Water Resource Groups have concluded our plan is aligned
3.—(2)	In this paragraph— "regional water resources plan" means a voluntary regional strategic plan produced by a regional group which identifies measures that may be taken for the purpose of improving the management and development of water resources.	We've met with Regional Planning Groups 9.2 Regional Plans

	"regional group" means one of the following recognised groups—	
(a)	Water Resources North;	
(b)	Water Resources West;	
(c)	Water Resources East;	
(d)	Water Resources South East;	
(e)	West Country Water Resources.	
Submitting draft water resources management plans and water resources management plans to the Secretary of State		
4.	Except where the Secretary of State otherwise directs and subject to sub-paragraph 4(c), for the purpose of section 37B(1) of the Act—	
(a)	Other than in the case of Southern Water Services Limited, a water undertaker must send a draft of its water resources management plan to the Secretary of State on or before 3rd October 2022;	Complete
Publication of draft water resources management plans		
5.—(1)	Except where the Secretary of State otherwise permits, a water undertaker must publish its draft water resources management plan in accordance with section 37B(3)(a) for consultation within 30 days beginning with the date on which the Secretary of State confirms it should do so	Complete
Responding to representations		
6.	Except where the Secretary of State otherwise permits, a water undertaker must publish the statement required by regulation 4(2)(a) of the Water Resources Management Plan Regulations 2007(a), and send a copy of the statement to the persons specified in regulation 4(2)(b), within 26 weeks beginning with the date of publication of the draft water resources management plan	Complete

SECTION 2

Introduction

2.1 Albion Water's Drought Plan Process

Section 37A of the Water Industry Act (1991) states:

1. It shall be the duty of each water undertaker to prepare and maintain a water resources management plan.
2. A water resources management plan is a plan for how the water undertaker will manage and develop water resources to be able, and continue to be able, to meet its obligations under this Part.

Section 37D of the WIA states:

1. Directions given under section 37A or 37B above may be –
   a. general directions applying to all water undertakers; or
   b. Directions applying to one or more water undertakers specified in the directions.

Whilst the WRMP guidelines recognise that they must be applied proportionately to NAV companies Albion Water has previously expressed, and maintains, serious concerns over the impact of the WRMP statutory process on inset competition.

Albion Water has previously submitted that an appropriate route to ensuring reliable supplies to the customers of inset appointees, in the absence of an independent water resource, would be as a statutory consultee to an incumbent's plan or, consistent with 37D(1)(b) above, under simplified direction. In the absence of these routes, this plan has been completed with the benefit of existing guidance, feedback received and regulatory proportionality.

2.2 Consultees

Our final plan takes in to account responses to the points, comments and feedback by the following statutory and other consultees:

Our Customers
Thames Water
Essex and Suffolk Water (Northumbrian Water)
Local Authorities
Drinking Water Inspectorate
Environment agency
Defra
Natural England
Consumer Council for Water

In addition, we have met with Regional Water Resource planning groups, who haven't raised any issues with misalignments with their regional plan which feeds up to the national plan.

3 Water Resources Management Plan (WRMP24)

First submitted in October 2022, this plan covers the statutory minimum period 2025 – 2050 and represents our finalised post consultation plan.

3.1 Levels of Service

Our levels of service will be the same as the relevant incumbent water company for each of our supply areas, which we have transposed in to this report. (Sections 4.3.6 and 5.3.6)

3.2 Changes since our last plan

Previous plans were influenced by rainwater / green water reuse ambitions for our drinking water and sewage treatment sites located in Gloucester and Essex. However, whilst dual-use infrastructure is in place and evidence shows per capita consumption (PCC) can be reduced by approximately 25%, these schemes remain unfunded and subject to engineering, commissioning and regulatory challenges; despite such schemes being largely supported by the majority of regulators and despite the stressed nature of water resources, particularly across the Thames Water area.

Such schemes are where NAV's could make a big difference to the environment, government targets and to customers. Furthermore, perhaps NAV's are better placed to manage the risks for such schemes, as we have inherently more focus on our smaller developments, not least for financial reasons.

As such, as new owners we have decided to remove water reuse from our water resource management plan and planning tables – which no longer account for the benefits of these schemes.

Previous plans contained uncertainties for leakage and consumption figures for our Upper Rissington site in Gloucester, more so than those for our Oaklands Hamlet, Chigwell site. An audit and rationalisation of inherited data together with a thorough review of our billing and metering information has allowed us to make more certain our forecasts compared to previously published water resource management plans, including the draft plan. The revised figures presented here and in planning tables are therefore significantly different to those communicated in the past.

Lastly, we have structured this plan differently to those previously published to allow us to focus on each of our two drinking water sites separately, not least because they are in no way related, geographically or incumbent water company, housing stock, etc.

Section 3 Relates to our Upper Rissington, Gloucester Supply Zone and Section 4 relates to our Oaklands Hamlet Supply Zone, Chigwell.

We have adopted the plan structure suggested within the water resources planning guidance for New Appointments and Variations (NAVs).

3.1 Limitations

As new owners we are in the process of reformulating our processes to ensure our information systems are cleansed, enhanced and enriched to be able to provide the best possible service to all our customers, regulators included. Whilst we have made significant progress since the publication of our draft plan, there is further work to be done. However, the figures presented here are significantly more reliable than Albion Water has presented previously.

The values for 2023-24 are by far our best account of supply and demand and should be used in lieu of previous data as the Base Year. Whilst imported bulk flows are also accurate for 2020 and 2021; the allocations for consumption are limited.

SECTION 3

WRMP for Upper Rissington, Gloucester

4 WRMP – Upper Rissington, Gloucester

Section three focuses on our drinking water supply site located in Gloucester, England and describes how we intend to provide a secure supply to our customers over the next 25 years, whilst protecting the environment.

4.1 Site name and any other historic site names

Upper Rissington, in Gloucester is a former Royal Air Force (RAF) base from the 1930s through World War II and operated as a training base until the 1980s. During the 1980s and early 1990s the base was operated by the United States Air Force (USAF), eventually closing in 1994. In 1996, the housing in the 'village', now called Upper Rissington, was sold.
The former RAF base was purchased by Linden & Bovis Homes in 2012.

Albion Water was contracted to provide water and waste-water services to the new development area known as Victory Fields and to refurbish and adopt the old private water and waste water infrastructure in the village.

The new development features dual supply infrastructure, where the toilets and outside taps can be supplied from a source of recycled water (treated recycled effluent and/or harvested rainwater) if commissioned.

The successful refurbishment of the water supply network has resulted in a more reliable service and leakage has already been reduced by 1 million litres a day. See Section 4.3.3.

A mixture of existing and newly built homes[1] Albion Water provides drinking water and sewage services to the entire site. 'The Camp' area contains the older housing stock and supply network where many properties are charged on an assessed (unmeasured) basis. 'Victory Fields' area is the location of the new houses with the dual supply infrastructure that is fully metered with 3G AMR Concentric 15 mm Smart Meters.

[1] The site has some existing homes in an area that we call The Camp. Bovis and Linden (now Vistry) have built 368 new build houses in an area called Victory Fields. All 368 homes are metered and have a dual infrastructure for potable and non-potable water supply.

4.2 Location map

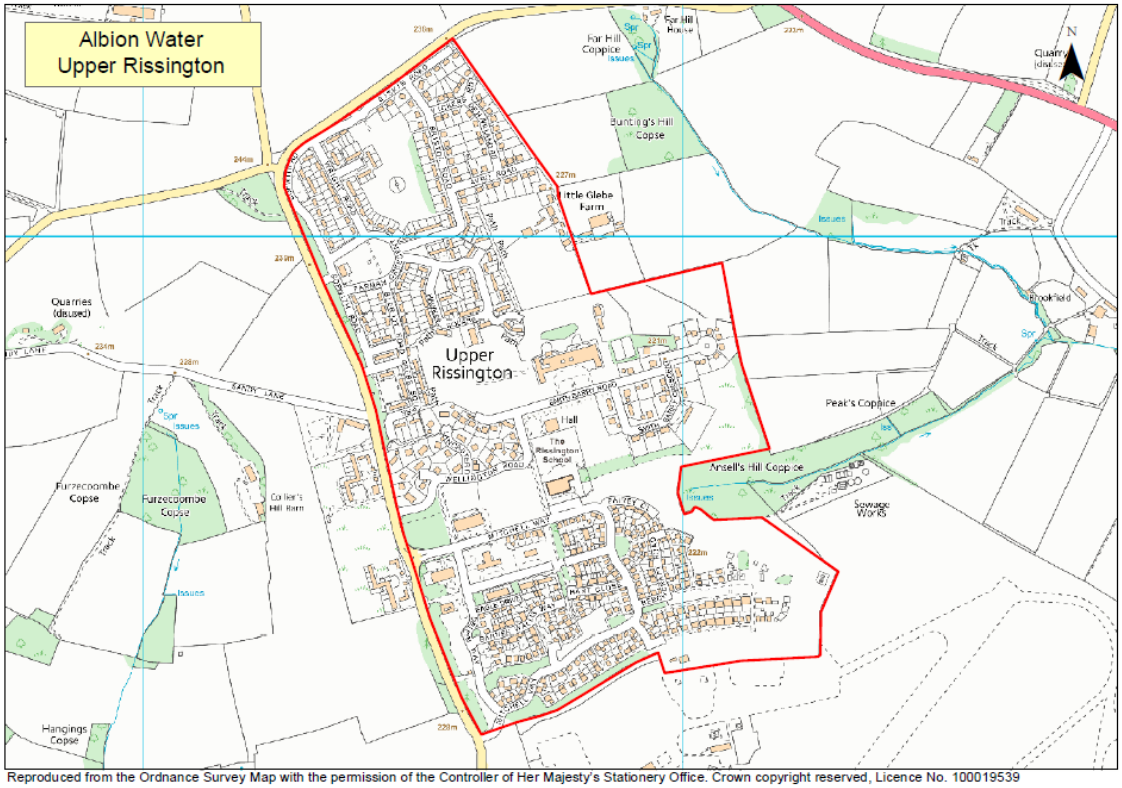

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Figure 1 - Upper Rissington, Gloucester

4.3 Duration and Details of the Bulk Supply Agreement

Drinking Water supplies to Upper Rissington, is known as a Bulk Supply New Appointments and Variations (Bulk Supply NAV). Drinking Water is supplied under a bulk supply agreement with Thames Water effective from 28th June 2023. The Bulk Supply Agreement is in perpetuity / evergreen.

Our bulk supply is our water available for use (WAFU).

Maximum Daily Volume	Maximum Annual Volume
424.66 m^3	155,000 m^3

4.3.1 detail the incumbent and relevant water resource zone that your bulk supplies are to be sourced from

Sourced from their Bourton North Cotswold Water Supply Zone, the current bulk supply agreement with Thames Water allows for a maximum daily supply of 424.66 m^3 per day to be taken from the bulk supply point.

4.3.2 detail the duration of the import/bulk supply agreement and whether these can be varied for any reason e.g. drought conditions or pain share agreements. If there are variations, you should describe these restrictions and how you will manage them

Our bulk supply arrangements were last agreed on the 28th June 2023 (replacing the agreement effective from 10th September 2013) and are negotiated to expire only if the NAV is dissolved or if there is a default of terms.

The Thames Water infrastructure to our site is capable of suppling us with much more than this agreed volume and therefore is only constrained by virtue of the contractual agreement.

4.3.3 demonstrate that it is secure for the whole planning period. If this is not the case, you should explain the process of renewal and/or change. Your supplies should be secure for at least 10 years

The Thames Water infrastructure to our site is capable of suppling us with much more than agreed contractually and therefore is only constrained by virtue of the contractual agreement.

The historic level of demand for Upper Rissington is shown on the graph below. Up to 1.4 Ml/d of water was regularly supplied by Thames Water to the Upper Rissington Management Company (RMC), who were the operators of the private distribution network, prior to Albion Water's license being varied to include the Upper Rissington area.

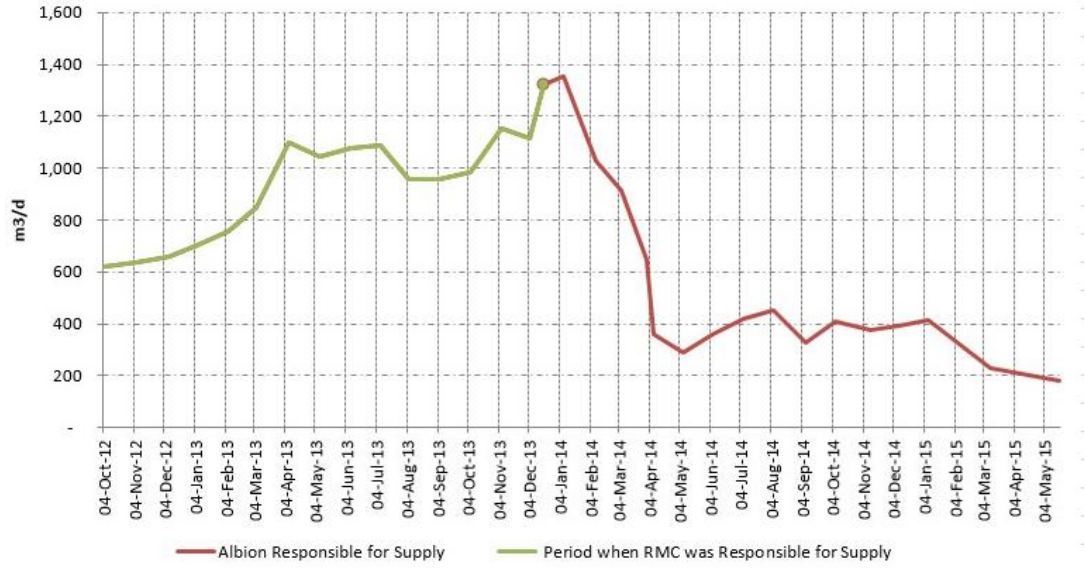


Figure 1 Historic Demand for Upper Rissington (showing reduction in consumption)

Shortly after the system came under the management of Albion Water there was a dramatic reduction in the volume of water required to service the needs of the Upper Rissington customers. This reduction was achieved by a combination of the following:

- leakage management and control
- mains rehabilitation and renewal
- network optimisation
- installation of domestic water meters with facility for automatic meter reading (AMR)

In addition, see Section 4.14 Scenario Testing

4.3.4 explain the process for renewing or increasing bulk supplies, where already established.

Whilst the agreement is indefinite, we have shared with the incumbent water company the following triggers so that deficits can be avoided in future. There are three processes which can act to trigger a review of our bulk supply agreements to ensure that there are no deficits:

- Prior to the need to draft a WRMP (Every five years).

- As part of the annual liaison meeting during which the volumes and capacity (surplus / headroom) shall be discussed and minuted.

- When the data from the bulk supply meters is be compared to the volumes invoiced every month.

The following triggers will be applied:

Only when volume of water consumed is reliably within the five percent of the planned headroom for that period then steps will be taken to modify the agreement to ensure there are no deficits.

Should the volume of water consumed be within the ten percent of the planned headroom for that period then steps will be taken to target consumer demand through messaging and customer communications. This will run parallel with a focus on leakage to determine the contribution leakage is making to demand and whether its economical to stem demand through repairs, or water wastage notices.

Should the volume of water consumed be within the five percent of the planned headroom for that period then steps will be taken to increase targeted consumer demand through messaging and customer communications to those properties driving up overall demand, in excess of the average demand. Increased focus on leakage to determine the contribution leakage is making to demand and whether its economical to stem demand through repairs, or water wastage notices.

Only after, the volume of water consumed reliable stays within five percent of the planned headroom, or permanently encroaches within the headroom volume planned will steps then

be taken to modify the agreement to ensure there are no deficits, or else agree the appropriate steps to be taken with the incumbent.

The process for renegotiation once the criteria above has been met is likely to be six months or less.

4.3.5 Resilience and security of supply

We have data (4.3.3) and tests (4.14) that show that the supply is resilient and secure for the duration of the planning period, and this is also in the context of the supply only being constrained contractually.

Our deployable output assessment will mirror that of Thames water for the SWOX zone.

4.3.6 Level of Service

During droughts we may need to take steps to restrict water use to ensure we are always able to maintain reliable supplies should the dry weather turn into an extreme drought. Our operating Levels of Service for water supply are the same as our incumbent; Thames Water as detailed in Table 1 below.

This table reflects the most recent Level of Service (LoS) as detailed in their current published Drought Plan.

Restriction Level	Description	Water Use Restrictions	Frequency of Occurrence
Level 1	Impending Drought	Intensive media campaign	Not more than once every 5 years (20%)
Level 2	Early Stages of Drought	Temporary Use Ban (Enhanced Media Campaign)	Not more than once every 10 years (10%)
Level 3	Sever Drought	Non Essential Use Ban (NEUB) (Drought Order and Drought Permits – applied for in a staged manner)	Not more often than once every 20 years (5%)
Level 4	Extreme Drought	Emergency Drought Order (Standpipes and rota cuts)	Not more often than once every 100 years until 2030 (1%) Not more often than once every 200 years until 2032 (0.5%) Not more often than once every 500 years thereafter (0.2%).

Table 1 - Thames Water Levels of Service

4.4 Supply Forecast

As promised in our draft plan, we now have an agreed bulk supply volume of 155,000 m^3 annually.

The site is now fully built out and therefore the number of properties and corresponding population predicted to be static.

4.5 Any WINEP Investigations

We aren't currently undertaking any investigations through the Water industry national environment programme (WINEP).

4.6 Current Population / Property Numbers and Forecast Build Profile

The Upper Rissington development is located on the site of an old MOD airfield, the concept was to create a lifestyle experience for residents which allowed for a self sufficient community with a school, public house, shops and sundry services.

The planned 735 properties were completed and straightforward, this included a school and 6 purpose built commercial units. Having failed to attract commercial investors the two parcels of land within the development set aside for a Public House and more business premises with B1 commercial status remained unutilised. One of these parcels was sold to Kendrick Homes. The second parcel remains up for sale and to date has received no offers.

Piper Homes purchased a parcel of land outside of the Albion NAV area and proceeded to build 26 houses. Whilst they could connect to the Thames water mains, the waste connection became difficult and subsequently led to them connecting to the Albion Sewerage network - these houses are not included in this report because they are sewage only.

Vistry completed construction and sale of 735 properties in 2022. Kendrick Homes is currently building 15 household properties that will be available for occupancy in 2023.

Three Residential properties have converted their garages to create and register separate business premises. Two further properties double as businesses and are captured in the 12 non-household numbers.

This takes the number of properties to 753 from the start of the planning period (2025) which we anticipate will remain the same thereafter.

Year	2022	2023	2024	2025
No. HH Properties	726	741	741	741
No. NHH Properties	12	12	12	12
Total properties	738	753	753	753

Table 2 – Summary of the number of properties up to the start of planning period

4.7 Smart Meter Penetration

Metering on Upper Rissington is a combination of 3G AMR Concentric 15 mm Smart Meters[2] and old Thames meters. The proportion of smart meters to other meters is 94 % : 6 %

For our commercial properties (12) 100% have 3G AMR Concentric 15 mm Smart Meters installed.

Using figures for 2023; For our domestic properties 560 are metered (75.6% of total domestic population) and of those 485 are charged using their consumption data.

75 domestic customers have meters installed but are billed using the assessed charges scheme due to historic agreements brokered during the planning consultation phase and honoured due to the "no worse off" rulings. Of the 75, 40 properties are non-smart (traditional) meters[3] and the remaining 35 are 3G AMR Concentric 15 mm Smart Meters.

The remaining 181 household properties are charged using assessed charges (an unmeasured basis). However, these properties are monitored via 60 multi-property (shared service) meters which allows us to monitor consumption and check for leakage. These operational meters have been upgraded to 3G AMR Concentric 15 mm Smart Meters and it was our plan to migrate these properties across to individual volumetric billing through a compulsory metering programme. However, this is no longer viable.

In our draft plan, it was our intention to install smart meters to properties that do not currently have smart meters installed. This was based on data that suggested that installing meters would increase revenue due to higher than average domestic consumption data that made this approach cost effective. However, as promised in our draft plan; a review of our

[2] "smart meter" means a meter that is installed to record water supplied to domestic premises, that can be read without having direct access to the meter installation and that can record data at least every 24 hours.

[3] These relate to properties that existed before the site was redeveloped; the properties are effectively new build for the extent of the redevelopment they underwent - hence being included in New building

information and data has shown that compulsory metering is not in the best interests of our customers or the financial health of our company – it can't be justified on higher than average domestic consumption because PCC for unmeasured customers is currently 99.40 l/p/d which exceeds future government targets, in the absence of billing by way of volumetric charges. Furthermore, it can't be justified financially since there are 181 unmeasured properties where individual smart meters could be installed and the cost to install meters varies from between £500 - £1000 per property. With little return on investment it exposes the company's financial health that is not in the best interests of customers, or the environment – the compulsory programme is not justifiable by either of these terms.

A summary of meter and billing types is shown below:

Metering and Billing Profile	2022	2023
Domestic premises	726	741
New build metering	726	741
Charged metering	470	485
Domestic metering	75	75
Optant metering	0	2
Smart meter	505	507
Traditional (Non-Smart) Meter	40	40
Unmetered	181	179

Table 3 – Summary of meter and billing types together with programme

4.8 Demand Forecast for Drinking Water

Upper Rissington	No. Properties	Occupancy[4]	Population
Metered	560	2.36	1,322
Unmeasured	181	2.36	427

Table 4 – Summary of property numbers and current population

Measured using values from our bulk supply meters, the actual annual metered volume of drinking water imported in to Upper Rissington during 2020 was 140,572 m^3 which increased in 2021 to 155,491 m^3 and 138,663.5 m^3 for 2022. These volumes were in excess of our

[4] UK average household size 2021 | Statista

Maximum Annual Volume of 112,055 m^3 agreed with the incumbent water company at the time of drafting our plan. However, since the 28th June 2023 – the date of the new bulk supply agreement the levels of consumption fall well below the current Maximum Annual Volume of 155,000 m^3.

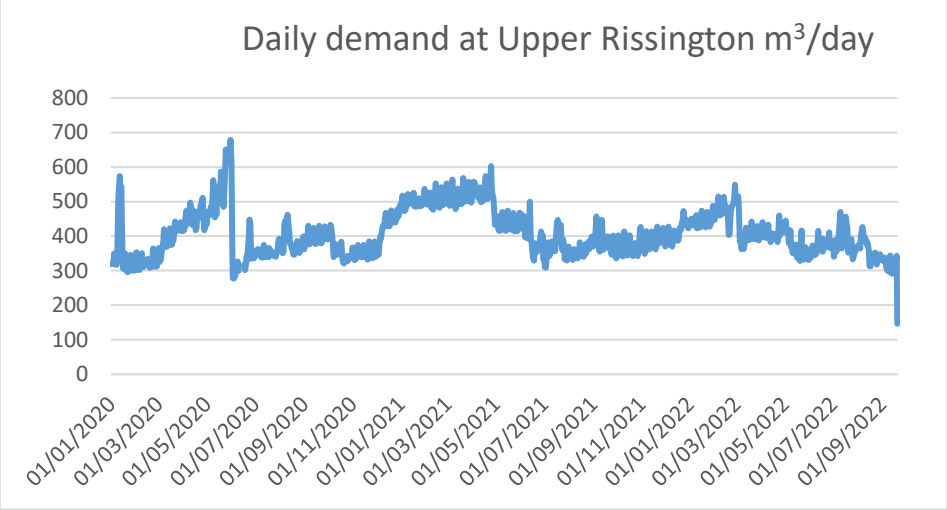


Figure 2 Daily demand at Upper Rissington

With an additional 15 houses expected to be occupied from 2023, it is likely that demand will increase in the order of 4,177.2 l/d or approximately 1,525 m^3 per year when applying an occupancy value of 2.36[2] and average household consumption of 118 litres per person per day (l/p/d). We have included this in our planning tables for 2023 for convenience.

4.8.1 Per Capita Consumption

Based on meter readings[5] broken down by group and 2022 data.

- The 60 multi property meters (181 unmeasured customers) (427 population) consume 15,492 m^3 per annum which translates to a PCC of 99.40 l/p/d (Table 5).
- The 75 customers (177 population) who are charged assessed but whose consumption is monitored consume 9,846 m^3 per annum. We can calculate the PCC as 152.40 l/p/d
- The remaining 485 (1145 population) consume 49,648 m^3 per annum and are billed volumetrically. We can calculate the PCC as 118.79 l/p/d

The figures are significantly lower than previously determined, as we know have significantly better data and accurate meter readings, which we didn't have at the time of drafting our plan.

[5] Meter reading data collected April 2021 to March 2022

Upper Rissington	No. Properties[6]	Occupancy[2]	Population	Consumption(m^3/d)	Per Capita Consumption (PCC) l/p/day)
Metered - Volumetric	485	2.36	1145	136.02	118.79
Metered - Unmeasured	75	2.36	177	26.97	152.40
Shared metered - Unmeasured	181	2.36	427	42.44	99.40
Sum of Metered Properties and Sum of All Domestic Properties					
Directedly Metered	560	2.36	1322	162.99	123.29
All domestic properties	741	2.36	1749	205.44	117.46

Table 5 – PCC for Upper Rissington

Average PCC for Upper Rissington (using 75,286 m^3 metered consumption and a population of 1749) is 117.46 l/p/d.

4.8.2 Non-Household Consumption

Non-household consumption each day is 53.96 m^3 – there is a primary school, one gym, one vet, a small number of shops, including a non-trading cafe and a few offices, together with Albion Water's sewage treatment works (50.86 m^3 /d).

In our planning tables we haven't included a population for the commercial consumption because 50.86 m^3/d is from our own sewage treatment works, and this volume used dwarfs that used by the remaining units.

4.9 Demand for Drinking Water Management Activities

4.9.1 Water efficiency

We will continue to engage with our customers to use drinking water supplies efficiently, and we have several existing channels to achieve this, including our website[7] where there are water saving tips and advice. Given the water stressed designation of this area, engagement will be greater with an emphasis on the sensitivity of the area to drought and water scarcity.

[6] Albion Water NAV Regulatory Reporting Tables 2021-22

[7] Saving water - Albion Water

In addition to this, we will be introducing a smart meter app through which we can engage and advise our customers on wise water use. This work will commence during 2023, and since our existing smart meters are already compatible with the application software[8] we will be able to notify our customers of any internal leaks or increases in consumption over the normal baseline, amongst many other things.

Customers will be able to access the customer engagement portal and see such things as up-to-date usage, and associated charts for monthly water usage and compare this to similar houses and occupancy.

Furthermore, given that Thames Water is a drought / water stressed area[9] we are able to apply compulsory smart metering for households that are otherwise billed by assessment. However, this is now likely to be through the optant route where there is also an opportune circumstance that makes financial sense to effect.

This strategy will allow us to drive down the consumption by those who are billed volumetrically and those who are individually metered but are billed using assessed charges because of a historic agreement.

4.9.2 Leakage

In our last Water Resource Management Plan, leakage was estimated at four percent and the authors at that time said that leakage was negligible by night-time usage assessments. In our draft, we said our leakage was approximately 25% using values extrapolated from data which has since been significantly improved.

Our latest analysis shows:

Our daily domestic metered usage is 206.3 m^3 which together with commercial usage at 53.96 m^3 accounts for total metered daily usage of 260.2 m^3 , or 94,981.4 m^3 per year.

With annual bulk imports measured at 138,663.5 m^3 for 2022, the volume of water we can attribute to leakage is 43,682.1 m^3 or 119.7 m^3 per day - or approximately 31.5 % of our anticipated bulk import volume.

This equates to 68.4 l/p/d (using a population of 1,749)

We have planned to reduce this volume of leakage by half within the next twelve months, and then again to a rate of 10% which we have carried forward in planning tables. In doing so, we have clearly rebased our 2017/18 leakage targets and taken onboard the recommendations by Regulators in the consultation period to ensure halving leakage is

[8] My Water Advisor

[9] Environment Agency email dated 06/07/2022 classifying area as serious water stressed area

prioritised; not least because of the water stressed nature of the Thames Water geographic area.

As new owners we now have an active system of monitoring for leakage within our network at Upper Rissington using flow data and smart meter alarms. When increased volumes indicate a leak we instruct our contractors who investigate and undertake an active find and repair service, or write to the customer with water wastage notices.

We anticipate water savings of 96.41 m^3/d by 2026.

4.9.3 New meter installation / Existing meter replacement)

Whilst previous data, used when drafting our plan, suggested installing new smart meters was cost beneficial and in the interests of meeting government consumption targets. This no longer remains the case.

There are 181 properties whose consumption is monitored using shared smart metering. In addition to this there are 40 meters that are not smart meters, which are part of a set of 75 meters that measure individual households that aren't billed volumetrically.

Whilst there is clear support amongst our customers for smart metering, the costs no longer stack up against the benefits. Therefore, any new meter installations will be to replace broken meters and other opportune circumstances, and where such circumstances exist we will install smart meters.

As things currently stand, we have approximately 70.18 % of all domestic properties covered by smart metering.

We are able to measure consumption across all customer through meters.

4.10 Future drinking water demand forecast

Non household consumption is currently 53.96 m^3 and we are not expecting this to increase, not least because the development is practically fully built out.

We forecast a reduction in non-household consumption because we use 50.86 m^3 per day at our sewage treatment works and we will plan to reduce this.

An additional 15 houses are expected to be occupied from 2023 and these have been built in to our planning tables but otherwise the demand is not expected to change.

4.11 Headroom Assessment

We plan to target a headroom of 10% of the distribution input. This is to accommodate extreme events (7%), such as bursts or societal issues (like those experience during lockdown) but also to account for climate change (3%).

See Section 7.0 Headroom

4.12 Drinking Water Supply-Demand Balance

We have no reason to believe that the supply is insecure for any period of time over the 25 year planning horizon. This is because we have demonstrated resilience with our bulk supply from Thames Water and have not forecast a deficit in the zone from which our drinking water is supplied from, when applying population increase factors and increased leakage factors and climate change factors during scenario testing. See Section 4.14

No allowance has been made for outage in the supply demand balance. The incumbent water company providing the bulk supplies have made an outage allowance in their supply demand calculations.

4.13 Our Plan for Upper Rissington

We have developed a six point plan for the next planning period which consists of work in the following areas; information systems, bulk agreement, customer, metering, leakage, water efficiency.

This plan has been subject to an commercial in confidence appraisal which weighs up our options for managing our water resources over the next regulatory period. See Annex 1.

Information Systems

As new owners we have taken steps to enhance and cleanse our data driven information systems. Our work starts with a wave of internal audits which seek to verify and enrich our records to ultimately improve our company's performance including resolving the uncertainties surrounding leakage. This work will be completed by January 2024.

This investment in time and money to understand customer consumption per household is necessary to monitor leakage and the results of our customer engagement strategy.

Bulk Agreement

Whilst we were running a deficit when we drafted our plan, we have now renegotiated our bulk supply agreement to provide an annual maximum of 155,000 m^3. This should provide ample headroom, when set against a backdrop of, leakage reduction and efficiency drive.

Customer Engagement

We will continue to provide our customers with drinking water saving advice and through our smart metering app will be able to enhance engagement about water usage which will apply the learning from our incumbent water company.

Commensurate with the encouragement by regulators to achieve government targets sooner there will be a programme of key messaging about usage to help customers maintain or reduce their consumption towards the 110 l/p/d by 2030. This is important because Upper Rissington lies within an area of water stress which means there is more pressure on the environment through the scarcity of natural water resources, and our engagement programme will reference these issues for awareness.

Customer engagement will be enhanced from 2025 with the roll out of the smart metering application that will allow customers to see their consumption every month.

Our planning tables include a reduction of metered daily consumption from 162.99 to 146 m^3 per day (16 m^3) or 12 l/p/d from 2030 which reflects the 110 l/p/d target consumption for metered customers. Unmeasured consumption already exceeds government consumption targets as it stands at 99.4 l/p/d or 100.5 l/p/d from 2023/24 onwards.

Furthermore we will look to migrate those metered customers (75) who pay assessed charges and have the highest consumption at 152.4 l/p/d across to volumetric billing when the right (cost effective) circumstances arise. However, these properties are also subject to a historic decision which will need some work and engagement to undo.

Compulsory Metering

Evidence[10] of the impact of smart metering on drinking water demand is that that moving from unmeasured to measured will save approximately 17 % of household consumption. Evidence also suggests that moving from a normal meter to a smart meter will save approximately 5 %. There is no evidence of bounce back (where consumption reverts to pre-smart metering levels) but the industry thinks that this could be averted by engaging the customer.

Smart metering will also help to identify leakage within the network and on customers' own properties which can account for as much as 10 percent of PCC[11]

Whilst compulsory metering is an important component of water resource planning because Upper Rissington lies within an area of water stress – a designation assigned to the geographical area of Thames Water – it is no longer a viable option because its been shown not to be cost effective. Annex 1.

[10] https://www.frontier-economics.com/media/4946/arqiva-cost-benefit-analysis-a4-full-report.pdf

[11] https://www.researchgate.net/publication/255747053_Smart_metering_Enabler_for_rapid_and_effective_post_meter_leakage_identification_and_water_loss_management

Our ability to implement a compulsory smart metering programme was confirmed by Defra as being allowed in correspondence subject to a cost effective assessment together with positive customer support. See Annex 1.

Defra concluded that such a programme is possible because in our role as a NAV, Albion Water is considered to be a water undertaker for the geographical areas in which it operates. Where a water undertaker is in an area of serious water stress they can propose to charge by reference to metered volume in their WRMP.

Whilst such proposals were supported by Regulators and our customers, a re-evaluation of our data, following significant improvements to records, no longer showed it was cost beneficial and therefore no longer features in our current plan.

Tackling Leakage

Upper Rissington lies within an area of water stress which means there is more pressure on the environment through the scarcity of natural water resources, and therefore our leakage programme will prioritise leaks detection and repair for this area by bringing leakage targets forward to 2025 – 2030, in recognition of the water stressed nature of the area and the recommendations made by our Regulators during the consultation period.

Our leakage strategy for this planning horizon will be:

1. Reactionary - acting on reported leaks
2. Active leakage control – ongoing maintenance of our network
3. Identifying internal leaks

The Camp is prone to leaks during periods of hot dry weather or cold wet spells. Typically located at the meter box, customers will report these visible leaks which we will then fix on a reactionary basis.

We also use meter data logging tools and will sweep the network if imports of drinking water increases disproportionate to customer consumption.

The next leaks we are actively identifying are internal leaks. Leaking toilets are a huge problem and if our meter data logging tools suggest a problem then we will notify the customer. If the internal leak is not fixed then as a last resort we will issue a Section 75 Notice for water wastage unduly consumed which the customer must fix within 14 days.

Similarly, underground supply pipe loses (USPL) is a component of customer side losses which we are currently unable to estimate owing to the absence of data collection, which we will start to gather from now on so that we can better estimate the rate / propensity for the supply pipes to be the cause of water loss any more than a faulty toilet cistern might be and report this estimate in the future.

Water Efficiency

The Government's water strategy for England sets an ambition of reduced per capita consumption of water through cost effective measures, to an average of 130 litres per person per day by 2030, or possibly even 120 litres per person per day depending on new technology.

Previously allocated to leakage, 50.86 m^3 of drinking water is being used each day operationally at our sewage works. We are currently investigating the cost benefit of using an inlet screen which does not require wash water. We are also looking into the possibility of using final effluent for this operational purpose save using any drinking water at all.

Our plan is to implement this improvement by 2025, the start of the planning period.

Whilst not integral to our plan for this planning period, we remain buoyant with our ambitious plans to complete work to make operational dual supply system. This work will take advantage of the developments existing dual supply infrastructure, where the toilets and outside taps can be supplied from a source of recycled water (treated harvested rainwater) if commissioned.

Toilet flushing and garden watering equates to approximately 25 % of total daily household demand (at peak times) which will have a dramatic benefit for water resources and significantly reduce PCC.

This work requires Regulators to work together to create an enabling legislative framework including a treatment standard which makes such work environmentally sustainable.

4.14 Scenario testing

Any WRMP must be robust, resilient and tested. In terms of scenario testing our plan to strength test our supply demand balance we have run three scenarios:

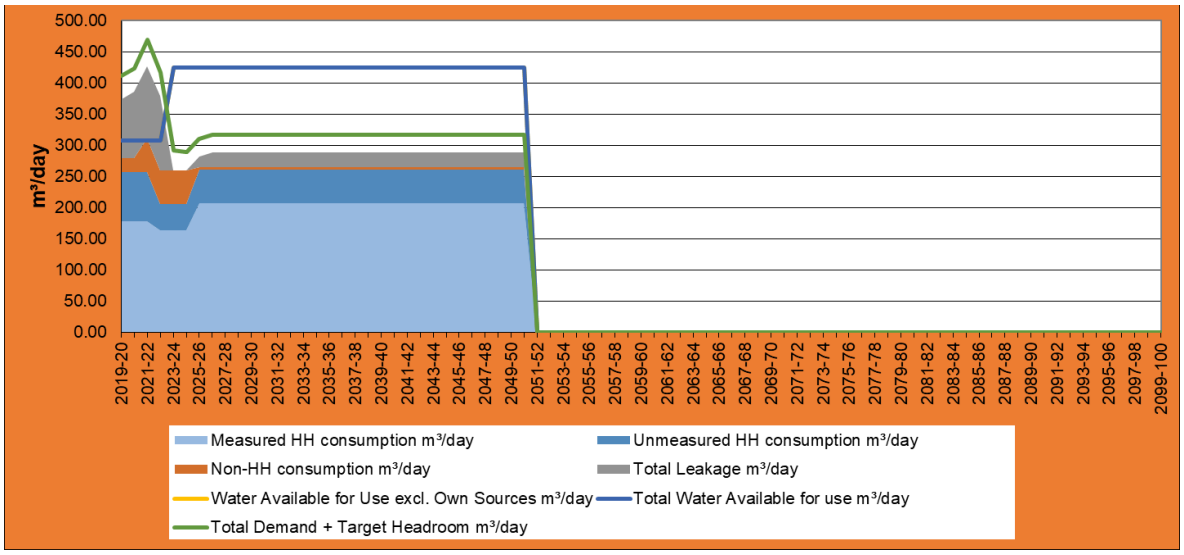
Scenario 1:

That the population increases from 1749 (Occupancy 2.36) to 2223 (Occupancy 3.0) for the period 2025 – 2050.

Upper Rissington	No. Properties	Occupancy[12]	Population	m^3/d
Metered	560	3.0	1680	207.13
Unmeasured	181	3.0	543	53.97

[12] UK average household size 2021 | Statista

The supply demand balance worsens from 168.7 m^3 to 107.46 m^3

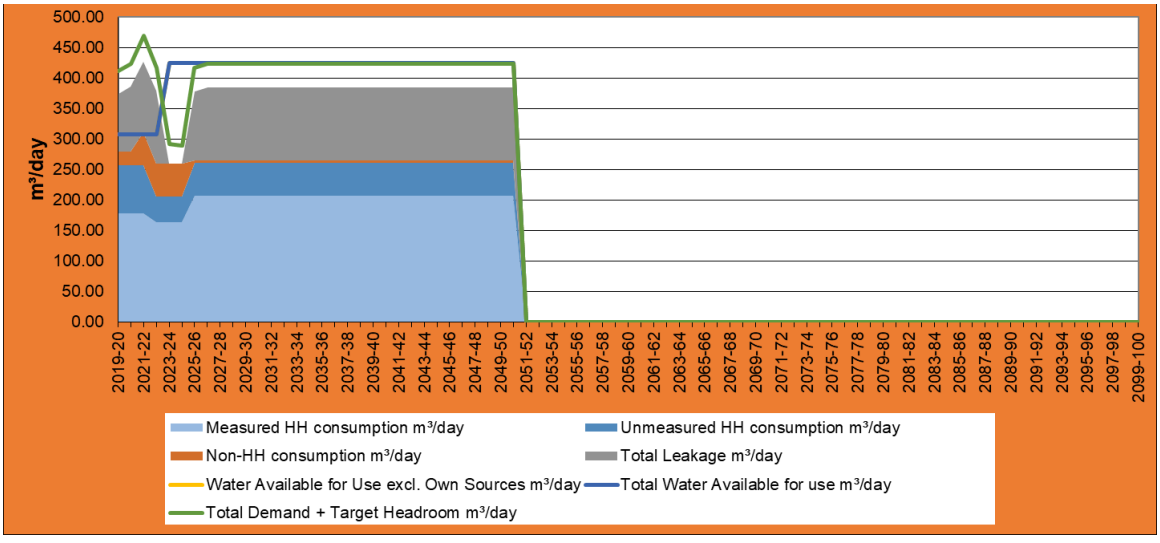


Scenario 2:

Leakage returns to a rate of approximately 30% (total leakage) as percentage of distribution input (119.70 m^3) with the same increased population presented in scenario 1.

The supply demand balance worsens from 168.7 m^3 to 1.42 m^3.

This is a completely unrealistic scenario now that we have good data and measures in place to monitor and fix leakage but proves that the supply would remain secure under this extreme circumstance.



Scenario 3:

That the population increases from 1749 (Occupancy 2.36) to 2223 (Occupancy 3.0) for the period 2025 – 2050 whilst at the same time climate induced increased consumption is tested at 1.5% and 8%; which are values taken from Thames Water's WRMP. (See Annex 3)

Upper Rissington	No. Properties	Occupancy[13]	Population	Unadjusted Consumption m^3/d	Climate Change 1.5%	Climate Change 8%
Metered	560	3.0	1680	207.13	210.24	223.70
Unmeasured	181	3.0	543	53.97	54.78	58.29

The supply demand balance worsens from 168.7 m^3 to 103.15 m^3 if climate change increases domestic consumption by as much as 1.5%. Additionally, the supply demand balance worsens from 168.7 m^3 to 84.49 m^3 if climate change increases domestic consumption by as much as 8%.

We conclude based on these tests that the supply is resilient and secure. Additionally, there is plenty of data that shows the supply is only constrained by virtue of contract.

[13] UK average household size 2021 | Statista

SECTION 4

WRMP for Oaklands Hamlet, Chigwell

5 WRMP - Oaklands Hamlet, Chigwell

Section four focuses on our drinking water supply site located in Essex, England and describes how we intend to provide a secure supply to our customers over the next 25 years, whilst protecting the environment.

5.1 Site name and any other historic site names

Oaklands Hamlet[14], Chigwell in Essex was a brownfield site redeveloped by Countryside Homes and consists of 432 new homes and 25 acres of public open space.

The development features dual supply infrastructure, where the toilets and outside taps can be supplied from a source of recycled water (treated recycled effluent and/or harvested rainwater) if commissioned.

Albion Water provides water and sewerage services to the our customers located here.

We have a bulk supply agreement from Northumbrian Water (the parent company of Essex & Suffolk Water) for the drinking water demand and we have built an onsite package sewage works which treats the wastewater.

5.2 Location Map

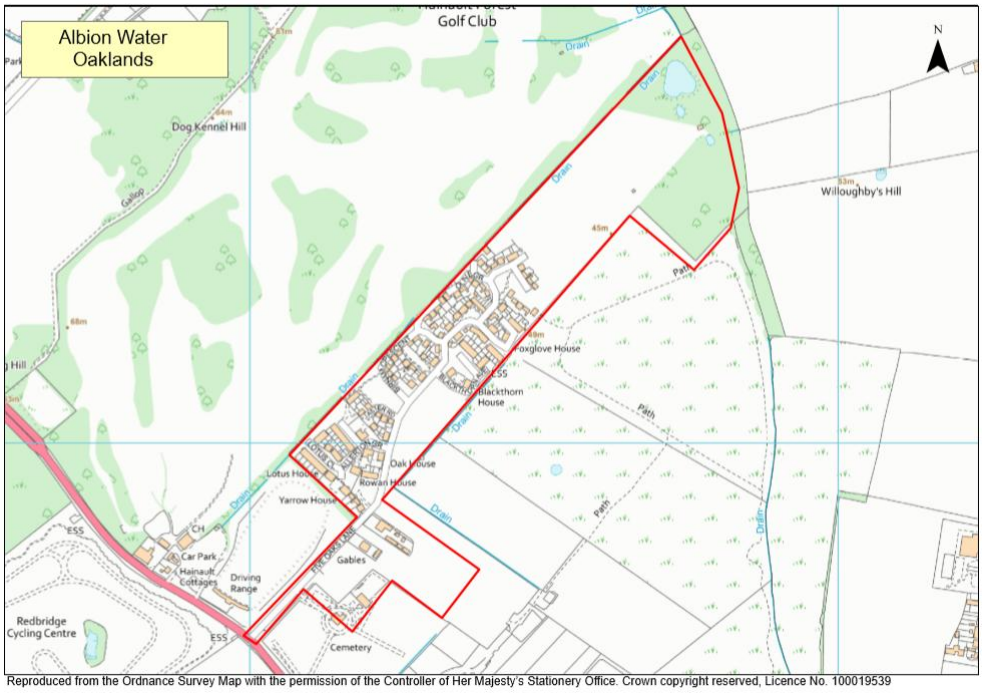


Figure 3 The area of the Oaklands Hamlet NAV

[14] Please note: Oaklands Hamlet is now the agreed name for this site in Chigwell, Essex. The previous Albion Water WRMP (published in 2019) calls the site Five Oaks Lane, but the developer and Albion Water now call this site Oaklands Hamlet as also used in our recently published Drought Plan.

5.3 Duration and Details of the Bulk Supply Agreement

Drinking water supplies to Oaklands Hamlet, is known as a Bulk Supply New Appointments and Variations (Bulk Supply NAV). Drinking Water is supplied under a bulk supply agreement with Northumbrian Water (the parent company of Essex & Suffolk Water).

Our bulk supply is our water available for use (WAFU).

Maximum Daily Volume	Maximum Annual Volume
143.8 m^3	52,500 m^3

5.3.1 detail the incumbent and relevant water resource zone that your bulk supplies are to be sourced from

Sourced from their Romford West Water Supply Zone, the current bulk supply agreement with Northumbrian Water allows for a maximum daily supply of 143.8 m^3 per day to be taken from the bulk supply point.

5.3.2 detail the duration of the import/bulk supply agreement and whether these can be varied for any reason e.g. drought conditions or pain share agreements. If there are variations, you should describe these restrictions and how you will manage them

The original agreement is dated 1st April 2016, and the arrangements were last agreed on the 20th January 2022 (to increase annual demand to 52,500 m^3). The agreement was negotiated to expire if the NAV is dissolved or if there is a default of terms.

5.3.3 demonstrate that it is secure for the whole planning period. If this is not the case, you should explain the process of renewal and/or change. Your supplies should be secure for at least 10 years

The previous bulk supply agreement with Essex & Suffolk Water allowed for a maximum daily supply of 87.67 m^3 per day and a maximum annual volume of 31,000 m^3. This was insufficient for the demand and so Albion Water increased the agreed bulk supply volume to 52,500 m^3 in 2022.

The bulk agreement allows for reasonable variation from the maximum annual limit.

5.3.4 explain the process for renewing or increasing bulk supplies, where already established.

Whilst the agreement is indefinite, we have shared with the incumbent water company the following triggers so that deficits can be avoided in future. There are three processes which can act to trigger a review of our bulk supply agreements to ensure that there are no deficits:

- Prior to the need to draft a WRMP (Every five years).
- As part of the annual liaison meeting during which the volumes and capacity (surplus / headroom) shall be discussed and minuted.
- When the data from the bulk supply meters is be compared to the volumes invoiced every month.

The following triggers will be applied:

Only when volume of water consumed be reliably within the five percent of the planned headroom for that period then steps will be taken to modify the agreement to ensure there are no deficits.

Should the volume of water consumed be within the ten percent of the planned headroom for that period then steps will be taken to target consumer demand through messaging and customer communications. This will run parallel with a focus on leakage to determine the contribution leakage is making to demand and whether its economical to stem demand through repairs, or water wastage notices.

Should the volume of water consumed be within the five percent of the planned headroom for that period then steps will be taken to increase targeted consumer demand through messaging and customer communications to those properties driving up overall demand, in excess of the average demand. Increased focus on leakage to determine the contribution leakage is making to demand and whether its economical to stem demand through repairs, or water wastage notices.

Only after, the volume of water consumed reliable stays within five percent of the planned headroom, or permanently encroaches within the headroom volume planned will steps then be taken to modify the agreement to ensure there are no deficits, or else agree the appropriate steps to be taken with the incumbent.

The process for renegotiation once the criteria above has been met is likely to be six months or less.

5.3.5 Resilience and security of supply

We consider our daily bulk supply volume to be water is resilient. This has been tested during Covid and this year's drought. Our deployable output assessment will mirror that of Essex & Suffolk Water.

5.3.6 Level of Service

The Environment Agency's Water Resources Planning Guideline (WRPG) we need to be able to plan to be resilient to a 1 in 200-year drought up to 2039 and to a 1 in 500-year drought to the remainder of the planning horizon.

During droughts we may need to take steps to restrict water use to ensure we are always able to maintain reliable supplies should the dry weather turn into an extreme drought. Our Levels of Service for water supply are exactly the same as our incumbent Essex & Suffolk Water (taken from their dWRMP 2024 Dec 2022) as detailed in Table 2 below.

Restriction Level	Restriction Description	Frequency of Restriction	Annual Chance of Restriction
Level 1: Appeal for restraint	Ask customers to use water wisely. For example, watering plants at night and not watering the lawn because grass is resilient to drought.	1 in 5 years	20% probability in any one year
Level 2: Temporary Use Ban	Applies mainly to the domestic use of water and stops the use of a hosepipe or sprinkler for any garden watering or cleaning.	1 in 10 years	10% probability in any one year
Level 3: Drought Order Ban	Bans what has been applicable to the domestic customer under the Temporary Use Ban, to non-domestic or commercial customers. These bans have economic consequences for businesses and must be used as sparingly as possible.	1 in 50 years	2% probability in any one year
Level 4: Reduced Supply at Customer Tap	A temporary reduction or nil supply of water at the customer tap. For example, reduced pressure at the customer tap (and therefore reduced flow), Rota cuts (e.g., 12 hours normal supply, 12 hours no supply); or, Standpipes where supplies to customer's taps are turned off leaving customers to fill containers from an in pavement standpipe tap	2025 to 2039: 1 in 200 years 2040 onwards: 1 in 500 years	2025 to 2039: 0.5% probability in any one year 2040 onwards: 0.2% probability in any one year

Table 2 Essex & Suffolk Water Levels of Service (taken from their dWRMP 2024 Dec 2022)

5.4 Drinking Water Supply Forecast

Our current supply volume is within the annual supply volume.

The constraints to the daily and annual supply are contractual and actual capacity of the infrastructure does not appear to restrict volumes beyond those agreed.

5.5 Any WINEP Investigations

We aren't currently undertaking any investigations through the Water industry national environment programme (WINEP).

5.6 Current Population / Property Numbers and Forecast Build Profile

The Oaklands Hamlet is now fully built out and so there won't be any additional demand arising from further developments, or construction thereof (building purposes and road cleaning).

We therefore anticipate that the demand for drinking water will be stable over the planning period.

5.7 Meter Penetration

All meters installed within Oaklands Hamlet are 3G AMR Concentric 15 mm Smart Meters. There are no other meter types installed; i.e. the proportion of smart meters to other meters is 100% : 0%

There are no commercial properties (No. 0)

With 100 % 3G AMR Concentric 15 mm Smart Meter penetration there is no intended programme for the implementation of domestic metering because all domestic properties are already covered by charged smart metering.

5.8 Demand Forecast for Drinking Water

Oaklands Hamlet	No. Properties	Occupancy[2]	Population
Metered	432	2.36	1019

Oaklands Hamlet is a fully developed site and therefore anticipate that demand will remain relatively stable across the planning period.

We will build in to our plan an increase in demand due to climate change of three percent over the planning period (this is adsorbed within the headroom target of 10 %, where 3 % is attributed to the impact of climate change and the remaining 7 % a margin for extreme events such as bursts, or societal issues such as those experienced during lockdown.

5.8.1 Per Capita Consumption

Based on meter readings[15] annual consumption is 35,582 m^3 per year. We can calculate the PCC as 95.67 l/p/d based on a population of 1003.

Oaklands Hamlet	No. Properties	Occupancy[2]	Population	Consumption (m^3/d)	Consumption (PCC l/p/day)
Metered	432	2.36	1019	97.48	95.67

5.8.2 Non Household Consumption

There is no non-household demand.

5.9 Demand management activities

5.9.1 Water efficiency

We will continue to engage with our customers to use drinking water supplies efficiently, and we have several existing channels to achieve this, including our website where there are water saving tips and advice.

In addition to this, alongside our planned smart meter upgrade we will be introducing a smart meter app through which we can engage and advise our customers on wise water use. This work will commence during 2023, and since our existing smart meters are already compatible with the application software[6] we will be able to notify our customers of any internal leaks or increases in consumption over the normal baseline, amongst many other things.

Customers will be able to access the customer engagement portal and see such things as up-to-date hourly usage, and associated charts for daily, monthly, and yearly review of water usage and compare this to similar houses and occupancy.

Furthermore, Northumbrian Water are happy to work with us and share their learning about delivering successful water efficiency campaigns and achieve a reduction in consumption.

5.9.2 Leakage

In our draft plan, data suggested that leakage at Oakland Hamlet was approximately 6 %. The idea that leakage was low tied in with pipes being new etc. However, our review of our data and records since our draft plan has revealed high levels of leakage.

[15] Meter reading data collected October 2020 to October 2021

Our daily domestic total metered daily usage is 97.48 m^3 , or 35,582 m^3 per year. The bulk supply volume imported is 150.59 m^3/d which equates to 54,966 m^3 per year.

Therefore the volume of water we can attribute to leakage is 19,384 m^3 per year or 53.12 m^3 per day or approximately 35 % of distribution input

This equates to 52.95 l/p/d (using a population of 1003)

We will aim to reduce our leakage by 50 % by 2024 and reduce the level of leakage to 10% of distribution input by 2025.

This should result in savings of 42.29m^3 per day by 2026

5.9.3 New meter installation / Existing meter replacement

All the meters in our Oaklands Hamlet are smart meters. However, we are planning to introduce a smart meter app, from the start of this planning period, through which we can engage and advise our customers on wise water use. This work will commence during 2023, and since our existing smart meters are already compatible with the application software[6] we will be able to notify our customers of any internal leaks or increases in consumption over the normal baseline, amongst many other things.

5.1 Headroom Assessment

We plan to target a headroom of 10% of the distribution input. This is to accommodate extreme events (7%), such as bursts or societal issues (like those experience during lockdown) but also to account for climate change (3%).

See Section 7.0 Headroom

5.2 Drinking Water Supply-Demand Balance

Essex & Suffolk Water are forecasting a headroom deficit from 2025 due to new non-household growth, abstraction sustainability reductions and the impacts of the latest climate change projections on supply. Given the forecast headroom deficit from 2025, their levels of service are likely to change and we will change ours accordingly to be the same.

No allowance has been made for outage in the supply demand balance. The incumbent water company providing the bulk supplies have made an outage allowance in their supply demand calculations.

5.3 Our Plan for Oaklands Hamlet

We have developed a five point plan for the next planning period which consists of work in the following areas; information systems, customer, metering, leakage, water efficiency. See Annex 2

Information Systems

As new owners we are taking steps to enhance and cleanse our data driven information systems. Our work starts with a wave of internal audits which seek to verify and enrich our records to ultimately improve our company's performance including resolving the uncertainties surrounding leakage. This work will be completed by January 2024.

Customer Engagement

We will continue to provide our customers with drinking water saving advice and through our smart metering app will be able to enhance engagement about water usage which will apply the learning from our incumbent water company.

However, customers are already exceeding the PCC consumption targets set by government, and realistically our engagements are unlikely to improve the efficient use of water beyond that already being achieved (95.67 l/p/d – which is well below the 145 l/p/d average widely reported)

Metering

All properties are smart metered.

Tackling Leakage

Our leakage strategy for this planning horizon will be:

1. Reactionary - acting on reported leaks
2. Active leakage control – ongoing maintenance of our network
3. Identifying internal leaks

Typically located at the meter box, customers will report these visible leaks which we will then fix on a reactionary basis.

We also use meter data logging tools and will sweep the network if imports of drinking water increases disproportionate to customer consumption.

The next leaks we are actively identifying are internal leaks. Leaking toilets are a huge problem and if our meter data logging tools suggest a problem then we will notify the customer. If the internal leak is not fixed then as a last resort we will issue a Section 75 Notice for water wastage unduly consumed which the customer must fix within 14 days.

Similarly, underground supply pipe loses (USPL) is a component of customer side losses which we are currently unable to estimate owing to the absence of data collection, which we will start to gather from now on so that we can better estimate the rate / propensity for the supply

pipes to be the cause of water loss any more than a faulty toilet cistern might be and report this estimate in the future.

Water Efficiency

The Government's water strategy for England sets an ambition of reduced per capita consumption of water through cost effective measures, to an average of 130 litres per person per day by 2030, or possibly even 120 litres per person per day depending on new technology.

With PCC within our Oaklands Hamlet as low as 95.67 l/p/d, our customers are already using drinking water very efficiently when compared to the national average of 145 l/p/d or the 2030 target of 130 l/p/d set by the Government.

Since our customers are already using water efficiently; our strategy is to continue with the customer engagement as we currently do. We have carried the PCC through to 2050 unchanged at 95.67 l/p/d an aim to help customers maintain this.

Whilst not integral to our plan for this planning period, we remain buoyant with our ambitious plans to complete work to make operational the dual supply system. This work will take advantage of the developments existing dual supply infrastructure, where the toilets and outside taps can be supplied from a source of recycled water (treated harvested rainwater) if commissioned.

Toilet flushing and garden watering equates to approximately 25 % of total daily household demand (at peak times) which will have a dramatic benefit for water resources and significantly reduce PCC.

This work requires Regulators to work together to create an enabling legislative framework including a treatment standard which makes such work environmentally sustainable.

5.4 Scenario testing

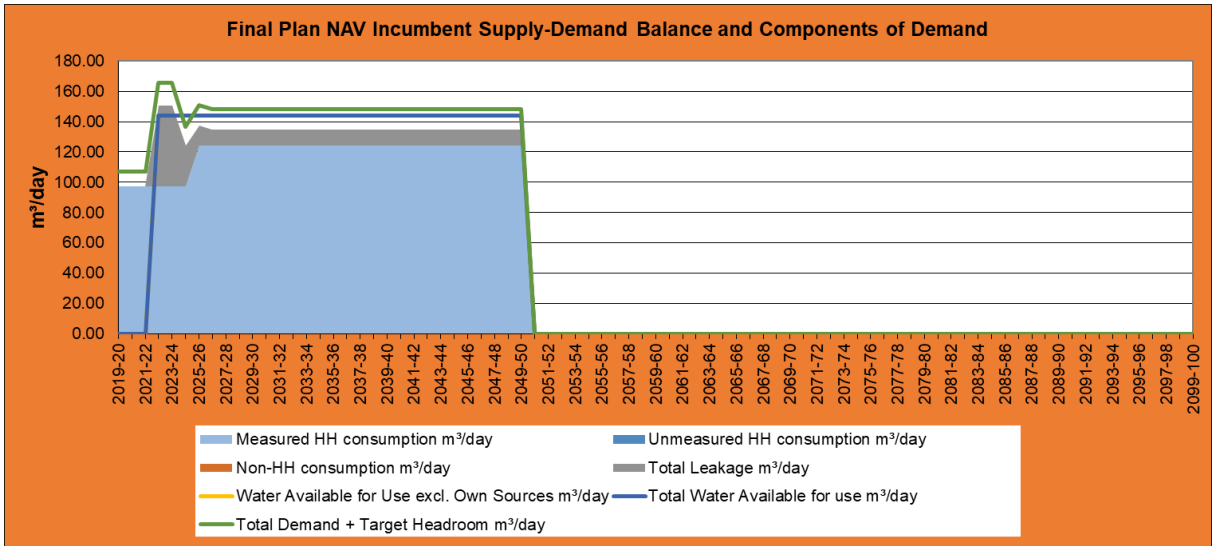
Any WRMP must be robust, resilient and tested. In terms of scenario testing our plan to strength test our supply demand balance we have run three scenarios:

Scenario 1:

That the population increases from 1749 (Occupancy 2.36) to 2223 (Occupancy 3.0) for the period 2025 – 2050.

Oaklands Hamlet	No. Properties	Occupancy	Population	Consumption (m^3/d)	Consumption (PCC l/p/day)
Metered	432	3.0	1,296	123.99	95.67

The supply demand balance worsens from 21.96 m^3 to -7.2 to -4.5 m^3 for the period 2025 – 2050 which is within the 10 % headroom.

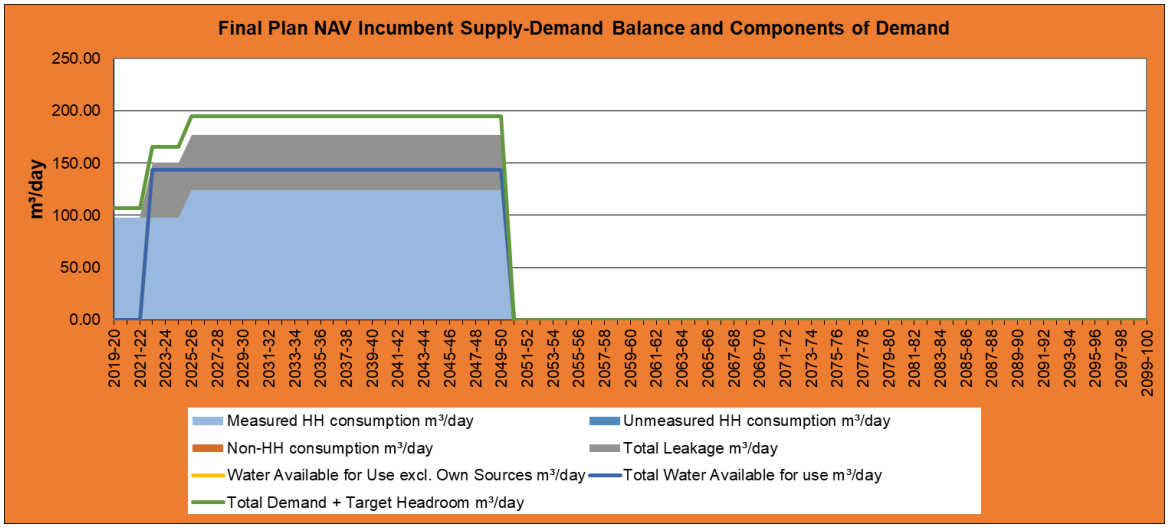


Scenario 2:

Leakage returns to a rate of approximately 35% (total leakage) as percentage of distribution input (53.12 m^3) with the same increased population presented in scenario 1.

The supply demand balance worsens from 35.24 m^3 to -51.02 m^3.

This is a completely unrealistic scenario now that we have good data and measures in place to monitor and fix leakage but shows how leakage is an important factor for maintaining a secure supply.

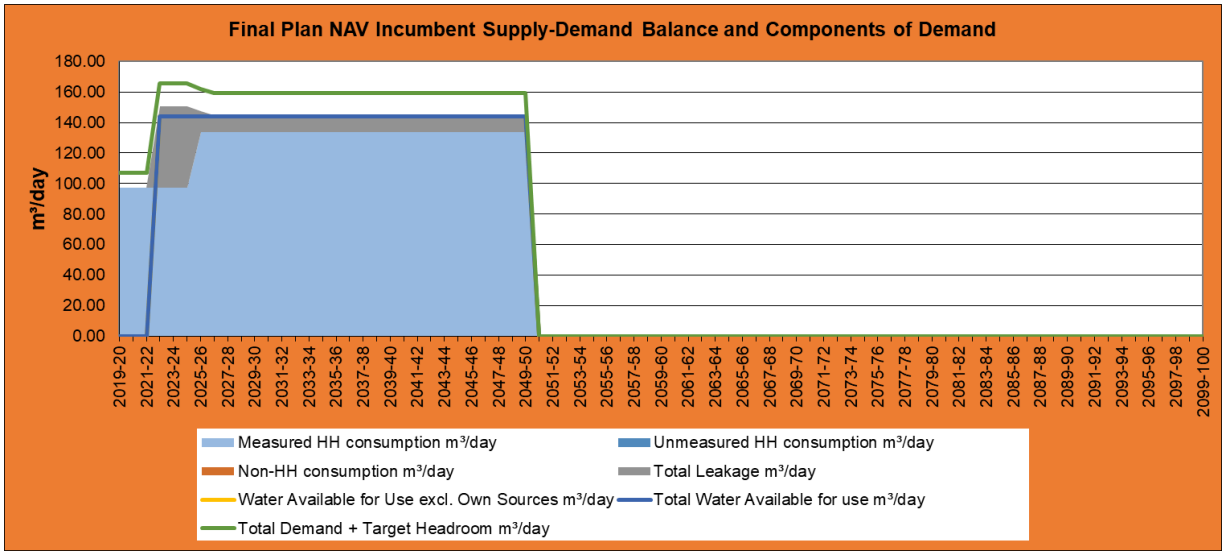


Scenario 3:

That the population increases from 1003 (Occupancy 2.36) to 1275 (Occupancy 3.0) for the period 2025 – 2050 whilst at the same time climate induced increased consumption is tested at 1.5% and 8%; which are values taken from Thames Water's WRMP. (See Annex 2)

Oakland s Hamlet	No. Properties	Occupancy	Population	Consumption (m^3/d)	Unadjusted Consumption (PCC l/p/day)	Climate Change 1.5%	Climate Change 8%
Metered	432	3.0	1296	125.84 – 133.90	95.67	97.10	103.32

The supply demand balance worsens from 35.24 m^3 to -9.23 to -6.54 m^3 across the planning period (2025-2050) if climate change increases domestic consumption by as much as 1.5%. Additionally, the supply demand balance worsens from 35.24 m^3 to -18.10 to -15.4 m^3 across the planning period (2025-2050) if climate change increases domestic consumption by as much as 8%.



Our tests show that for population increases, the supply would be operating within the 10 % headroom, similar to the 1.5% climate change increase in consumption tested. However, for the leakage test and the 8% increase in consumption climate change impact tested we would need to renegotiate the bulk supply agreement.

We conclude that with careful leaking management, if we are able to reduce leakage as planned then the supply should remain secure. If we start to operate within the vicinity of the headroom safeguarding extreme events then we will look to renegotiate the bulk agreement according to the triggers set out earlier in this report.

6 Drought reliability and drought actions

Albion Water's drought management approach is largely controlled by those of the incumbent water companies whom we have bulk supply agreements with.

The Levels of Service and drought actions published in our Drought Plan are consistent with our WRMP.

The Drought Plan and our resilience in terms our Security of Supply was tested Summer 2022 where an official drought was declared by the Environment Agency.

7 Headroom

We plan to target a headroom of 10% of the distribution input, the same value as applied in our previous planning period. This is to accommodate extreme events (7%), such as bursts or societal issues (like those experienced during lockdown) but also to account for climate change (2 x 1.5%) as a precaution, despite there being a contractual agreement to supply a fixed volume free of the impact of climate change in terms of water available for use.

The reasons for these values are by virtue of discussing headroom with our water resources south east resource management group who put the range of headroom values applied by incumbents in the area as 5 – 8 %. Furthermore, where data is available amongst other NAVs who have applied a UKWIR risk assessment approach the range of values appear to fall within the range determined by incumbents.

We've included 2 x 1.5% buffer for the impact of climate change as a precaution using the data presented in Thames Water's dWRMP for 2025[16] which is an over estimation of the between 1.0 - 1.5% increase Thames Water has predicted for the increase in domestic consumption by 2050.

In addition, using data from our Rissington supply zone - based on the extreme increase in consumption as tested during Covid19 lockdown (March 2020 to December 2021) works out to 11.4 % increase based on the average of the two years 2020 and 2022 (139,617.75 m^3 / year) compared with the volume consumed in 2021 (155,491 m^3 / year).

When considered altogether we conclude it is reasonable that a 10 % headroom target is safeguarding for all but something as extreme as a pandemic driven lockdown and therefore shall remain applied during this planning period as it was in the previous planning period.

Current headroom is believed to be sufficient to mitigate future climate change and with no future expansion on the development to be adopted along with monthly leakage reviews

[16] Page 31 Table 6-9 6-Uncertainty-and-Baseline-Supply-Demand-Balance.pdf (thames-wrmp.co.uk)

which has been made possible with the employment of a data analyst and the incorporation of Power BI as a management tool to review data on a frequent basis.

In addition, Albion water has now engaged with the incumbents to ensure that quarterly review meetings are set up to align strategies and review emerging risks along with supporting regional planning targets.

Incumbent engagements will also include annual reviews of usage and demands, and review demands on the network and how Albions leakage strategy can align with regional challenges.

8 Outage

No allowance has been made for outage in the supply demand balance. The incumbent water companies providing the bulk supplies have made an outage allowance in their calculations and as such we have not included any in our planning tables

We have no sources of our own.

9 Environment Considerations

The Water Resource Planning Guidelines states that we must consider the need to carry out a Strategic Environmental Assessment (SEA) and a Habitat Regulation Assessment (HRA).

It is our view we are too small an organisation to undertake any meaningful Environmental or Habitat Assessment, especially since we don't have any schemes significant enough to warrant them.

In their assessment of our dWRMP; Natural England agrees that we are not required to undertake an SEA or HRA, given our small geographic supply area, together with their evaluation of the donor incumbent water companies respective of our drinking water supplies.

However, as recommended by Natural England, we have carried out a check with each incumbent to determine if the relevant assessments have been undertaken:

> For our drinking water supply to our Oaklands Hamlet, Chigwell supply; Essex and Suffolk stated that they have not conducted any environmental assessment for the existing bulk supply agreement with Thames Water because it is not a new supply option in their WRMP, and has therefore not undergone environmental assessment.
>
> In terms of the water supply to our Upper Rissington, Gloucester supply; Thames Water stated that the source for this supply is in their SWOX Water Resources Zone and all of the sources for this zone are deemed compliant from a SEA and HRA perspective. There is not specific SEA and HRA for the small bulk supply for Upper Rissington.

9.1 Green House Gas (CO2) Emissions

We have checked with the incumbent water companies and they do not have a CO_2 emissions per cubic meter value for existing sources; they only work this out for new sources. In any case, our assessment of CO_2 emissions is that they are negligible for the following reasons.

The drinking water supplies (abstraction, treatment, conveyance and storage) originate from incumbent water companies who will assess their emissions in their own right. We do not have any company vehicles for the purposes of carrying out work on drinking water sites and therefore assess our CO_2 emissions in this regard to be nil. Our contractors who provide sampling and analysis services, leakage detection and repair services will equally assess their emissions in their own right. Therefore, these activities are not part of our greenhouse gas emission contribution - which is in effect zero tonnes by our assessment.

We will, of course, work to reduce over all emissions in support of the delivery of the UK government's net zero greenhouse gas emission targets and commitments, by managing demand management in line with the targets set for these, and following any guidance that applies.

9.2 Regional Water Resources Plan

We have met with two regional planning groups and discussed our plan together with our targets and conclude that our plans align with the regional plans for supply demand management.

Furthermore, we will continue to liaise with the two regional groups and ensure we attend any meetings as appropriate.

10 Company Level Leakage

Leakage is a significant problem in both our supply areas, which is surprising given their age and use of modern materials. In our Rissington Water Supply Zone leakage is 31.5% of distribution input and for Oaklands Hamlet its 35.2%.

At a company level the volume of water leaking from our network is 63,366.1 m^3 annually.

Significant improvements were made to data and records to determine this value since our draft plan; initiated by our new senior management team. In recognition of the revenue being lost, we have already begun investing in surveying both sites for leaks and have already

identified work that needs to be undertaken to reduce this unwanted demand – including a 5 m^3 / day leak detected on a 63 mm supply in Rissington (Sat 8th June 2023).

In addition to the surveys, we are now collecting meter readings monthly. This not only allows us to respond to smart meter alarms quicker and initiate water wastage notices for consumer side leaks, we can also identify additional flows for pipes that we are responsible for – the benefit being enhanced cost control and environmental benefits together with bolstering headroom for our water resource management plans.

Its our company strategy to reduce our leakage from current levels (which have probably been going on for some time under the previous ownerships) by 50 % by 2024 and then to achieve 10 % leakage as distribution input by 2025 onwards.

In this regard; we recommend that Regulators pay little attention to the estimates given in the previous water resource management plan which were completely unrealistic. In terms of reducing leakage, it would be better to measure us as of 2023/24 data as this is bar far the best determination.

Compulsory Metering

See Annex 1 – Upper Rissington Water Resources Demand Options Appraisal [Commercial in Confidence]

Whilst customers support a compulsory metering programme, and whilst we recognise the assumed benefits of reduced consumption, additional intelligence from flow and smart meter alarms for leakage detection; our analysis based on significant improvements to our data and information is that it would not be cost effective.

11 Commercial in Confidence

Annex 1 and 2 contains commercially confidential material.

12 Board Assurance

This Water Resources Management Plan was reviewed by Albion Water's Senior Leadership Team before being recommended to the Board of Albion Water Limited who are assured that the plan would meet our customers demand for drinking water over the next 25 years.

PAGE BREAK PORTRAIT

Annex 1 – Upper Rissington Water Resources Demand Options Appraisal [Commercial in Confidence]

Since our ownership, commencing 24th March 2022 the reasons for the demand on our bulk supply which was in excess of agreement were unclear. The reasons why the demand has been running in deficit for years needed to be worked out methodically to ensure we focused our resources where best appropriate in support of customer expectations and the sustainability of our company.

Whilst there were a number of measures available to us to manage components of the supply and demand balance, given the records and data available to us at the time of planning the draft water resources management plan; it was felt our best option was to renegotiate the bulk supply agreement to remove the immediate issue of a technical deficit – technical because there has never been any issues raised by the incumbent, or experienced by our customers with the contractually excessive volumes drawn; and on this basis we thought the renegotiation would be quick and effortless but in reality took several months (November 2022 to June 2023).

The reason for this approach is that in year 2020 demand was 25% in excess of the agreed maximum annual volume, and in 2021 is was similarly 20% in excess and 2022 figures show the annual volume of water consumed was in excess of contractually agreed maximum of 112,055 m^3 by 24%.

Many customers were already recorded as using average volumes of water based on the information we had to hand when drafting our plan. Therefore using customer messaging as a measure to reduce demand to achieve a surplus / avoid a deficit was unrealistic and untargeted, not least because there was an absence of other reliable or meaningful information about the drivers for demand at that time.

In parallel to the renegotiations of the bulk supply agreement, we sought to deal with the issues associated with poor data and information so that we could better determine which demand management measures should be used to maximise a sustained surplus; with a view that any sustainable surplus can be easily returned to the environment by further revision to agreements through the annual review of water resource management plans.

Whilst our draft plan for the next regulatory period was to:

- to be able to reconcile bulk meter charges against billed revenue (account for water consumption and account for water losses)
- to levy correct and consistent charging across our customer base to maximise income (some households are consuming drinking water significantly higher than Government targets)
- to reduce leakage

Since our draft plan, we have already corrected and reconciled the data issues which has improved our ability to determine the volume of water being consumed by customers and leakage.

Furthermore, we identified the following issues:

- 89 meters unlinked to properties or customers
- 58 meters that are uncommunicative
- Unmeasured water used by developers
- 256 customers currently being billed on assessed charges rather than metered usage (75 of these have meters already installed)
- Accurate picture of leakage

Having now narrowed down the drivers for demand we are now able to create a finalised plan based on sound information and data.

Cost Effectiveness / Best Value Plan

Using data from the assessed charged households, 75 of which have meters the benefit of extra revenue would be £7,910.85 initially (the difference between the current assessed charges and volumetric bill). This doesn't take in to account the likely decrease in consumption arising from the introduction of smart metering for the purposes of volumetric billing; likely to be proportionate to an approximately 17% reduction in usage.

181 additional assessed charged households share 60 operational shared meters (for leakage, consumption and not for billing) the difference to revenue would be -£11,858.11 (the difference between the current assessed charges (£78,181.14) and volumetric bill (£66,323.03) based on consumption of 17,712 m^3 / 181 properties. This doesn't take in to account the likely decrease in consumption arising from the introduction of smart metering for the purposes of volumetric billing; however marginal this might be.

Installing smart meters to implement a compulsory smart metering programme would be in the range of £500 - £1000 per property and would be needed for 221 properties (£110,500 – £221,000). We've paid £3,840.00 for a survey to detail out the actual costs but the estimates are reasonable based on market rates.

Repairing the leaks

We've invested £5,952.00 to repair five significant leaks within Upper Rissington. This work should save a significant proportion of the volume 73,371 m^3 currently allocated leakage per annum. This will save costs of £0.8897 x 73,371 = £65,278.26.

Replacing the screen at the STW would cost £50,600 and save 50.86 m^3 of water every day or 18,563.9 m^3 per annum. This will save costs of £0.8897 x 18,563.9 = £16,516 per year once the capital has been recouped.

Our options are; to renegotiate the bulk supply agreement; enhance leakage detection and repair; enhance demand management; compulsory metering; replace the screen at our STW. Based on all the above, we conclude that the best value plan is to renegotiate the bulk supply agreement, tackle leakage and continue with customer engagement to reduce consumption to achieve government targets according to our planned timescales.

We further conclude that a compulsory metering programme is not cost beneficial even if it is supported by customers.

Customer Engagement and Support for Compulsory Metering

To ensure we comply with the legal requirements for compulsory metering we contacted Defra who set out the following conditions (verbatim).

- *The SoS may, after consulting the EA, determine the whole or any part of a water undertaker's area to be an area of serious water stress for the purposes of the regulations in certain conditions (see reg 4 in the attached)*
- *In it's role as a Nav, Albion is considered to be a water undertaker for the geographical areas in which it operates. (for example as defined in Ofwat's licences)*
- *Where a water undertaker is in an area of serious water stress they can propose to charge by reference to metered volume in their WRMP.*
- *On this basis, the EA updated the water stress determinations in 2021 as flagged here.*
- *As set out in the WRMP guidance, in England, a plan should evaluate charging by reference to volume based on universal metering for areas determined to be in areas of water stress.*
- *To the extent that Albion Water is in (an) area(s) of serious water stress, they can propose in their draft WRMP to charge by reference to metered volume.*
- *However, they will only then be able to do so where such proposals are shown to be cost effective (as per the WRMP Direction 2022) and there is customer support demonstrated as part of the consultation process.*
- *The restriction on charging by metered volume is on domestic premises only (i.e. where people live/homes) not on business premises.*
- *All new homes are metered by default.*

Whilst we have evaluated the cost effectiveness above, the following records the work we have undertaken to engage with customers together with a record of their support.

We drafted a letter to customers about our compulsory metering programme and shared this with CCWater before it was finalised and sent to customers. (Figure 1)

We sent the letter to all our customers in our Upper Rissington, Gloucester Supply Zone (753 Properties). We received three customer calls as a result. Two calls were from customer requesting to have meters fitted early and the remaining call was from a customer who expressed that it was about time all customers were billed volumetrically.

In addition to the letters, we surveyed 37 households across a varied section of the housing stock to ensure all views were represented.

The findings were as follows:

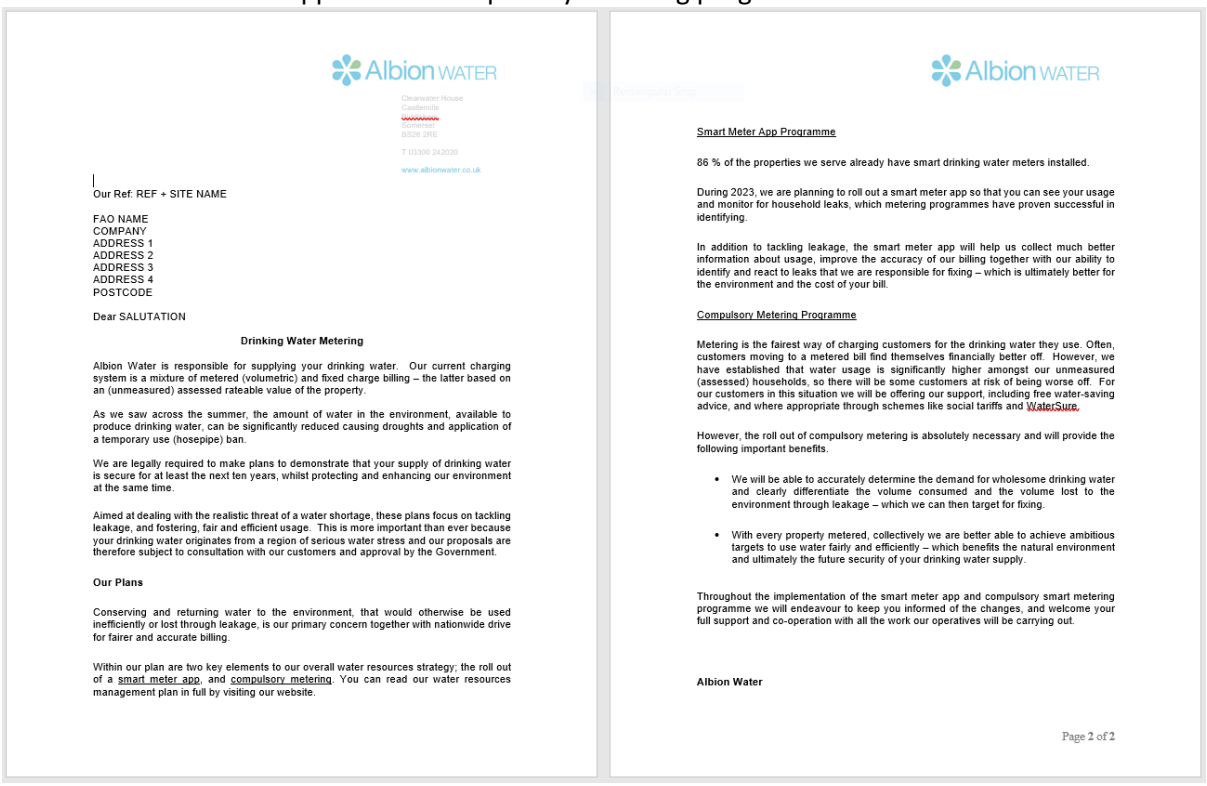
- 35 believed that water companies should have regard to climate change and should lead the way in promoting responsible water use.
- 2 believed they should be able to make their own choices and did not appreciate the hosepipe ban
- 37 people agreed that metering was a fair way to proceed. However 3 of those confirmed that they were not on meters and didn't want to be. One sighted their swimming pool as the main cause of not wishing to be metered.
- 37 people were happy with the service and communications coming from Albion Water
- 30 people have asked for more visibility of their consumption and are looking forward to the suggested smart meter app.

- 28 customers believed they had moderated their use of water to support climate change initiatives.
- 7 customers believed they didn't have to moderate their use – they perceived they were efficient enough.
- 2 believed since they pay for it they will do what they want until water companies stop all leakage
- 37 customers said they would report water wastage i.e. leaks, blocked drains if they saw a problem

All those surveyed said that metering was a fair way to proceed, and 35 said they thought it was down to Albion Water to have regard to climate change and lead the way promoting responsible water use.

In addition to the letter and survey, we updated the visual headline carousel on our website. (Figure 2) and added a web page dedicated to the metering programme, which was also shared with CCWater before publication. This has been on the website for several months and there hasn't been any adverse (unsupportive) comments from customers.

Based on the outcome of these three customer engagement activities, we conclude that we can show that there is customer support for a compulsory metering programme.



Albion WATER

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Our Ref: REF + SITE NAME

FAO NAME
COMPANY
ADDRESS 1
ADDRESS 2
ADDRESS 3
ADDRESS 4
POSTCODE

Dear SALUTATION

Drinking Water Metering

Albion Water is responsible for supplying your drinking water. Our current charging system is a mixture of metered (volumetric) and fixed charge billing – the latter based on an (unmeasured) assessed rateable value of the property.

As we saw across the summer, the amount of water in the environment, available to produce drinking water, can be significantly reduced causing droughts and application of a temporary use (hosepipe) ban.

We are legally required to make plans to demonstrate that your supply of drinking water is secure for at least the next ten years, whilst protecting and enhancing our environment at the same time.

Aimed at dealing with the realistic threat of a water shortage, these plans focus on tackling leakage, and fostering, fair and efficient usage. This is more important than ever because your drinking water originates from a region of serious water stress and our proposals are therefore subject to consultation with our customers and approval by the Government.

Our Plans

Conserving and returning water to the environment, that would otherwise be used inefficiently or lost through leakage, is our primary concern together with nationwide drive for fairer and accurate billing.

Within our plan are two key elements to our overall water resources strategy; the roll out of a smart meter app, and compulsory metering. You can read our water resources management plan in full by visiting our website.

Albion WATER

Smart Meter App Programme

86 % of the properties we serve already have smart drinking water meters installed.

During 2023, we are planning to roll out a smart meter app so that you can see your usage and monitor for household leaks, which metering programmes have proven successful in identifying.

In addition to tackling leakage, the smart meter app will help us collect much better information about usage, improve the accuracy of our billing together with our ability to identify and react to leaks that we are responsible for fixing – which is ultimately better for the environment and the cost of your bill.

Compulsory Metering Programme

Metering is the fairest way of charging customers for the drinking water they use. Often, customers moving to a metered bill find themselves financially better off. However, we have established that water usage is significantly higher amongst our unmeasured (assessed) households, so there will be some customers at risk of being worse off. For our customers in this situation we will be offering our support, including free water-saving advice, and where appropriate through schemes like social tariffs and WaterSure.

However, the roll out of compulsory metering is absolutely necessary and will provide the following important benefits.

- We will be able to accurately determine the demand for wholesome drinking water and clearly differentiate the volume consumed and the volume lost to the environment through leakage – which we can then target for fixing.
- With every property metered, collectively we are better able to achieve ambitious targets to use water fairly and efficiently – which benefits the natural environment and ultimately the future security of your drinking water supply.

Throughout the implementation of the smart meter app and compulsory smart metering programme we will endeavour to keep you informed of the changes, and welcome your full support and co-operation with all the work our operatives will be carrying out.

Albion Water

Page 2 of 2

Figure 1 – Customer letter about metering programme

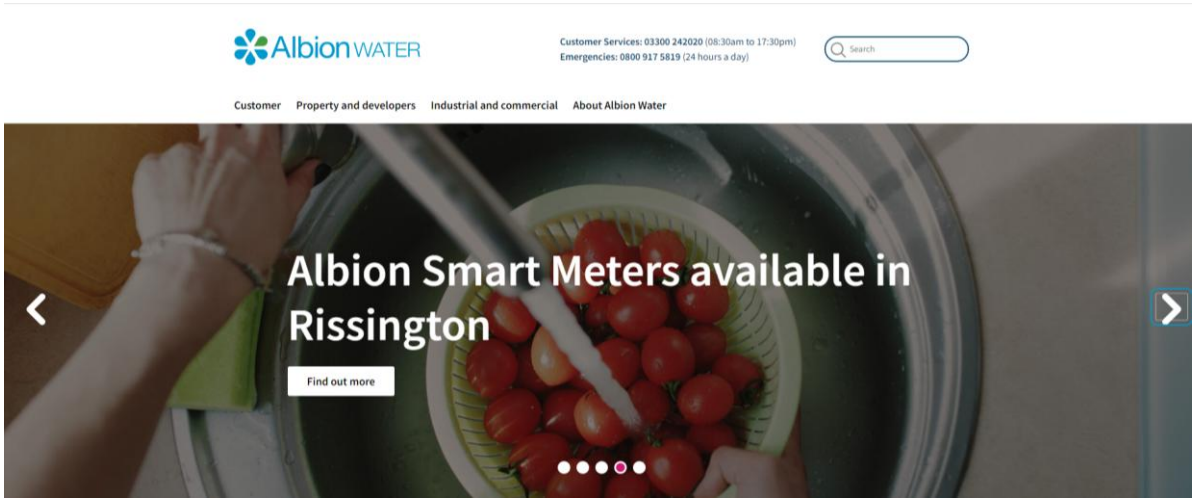

Figure 2 - Updated the visual headline carousel on our website about metering programme in Upper Rissington

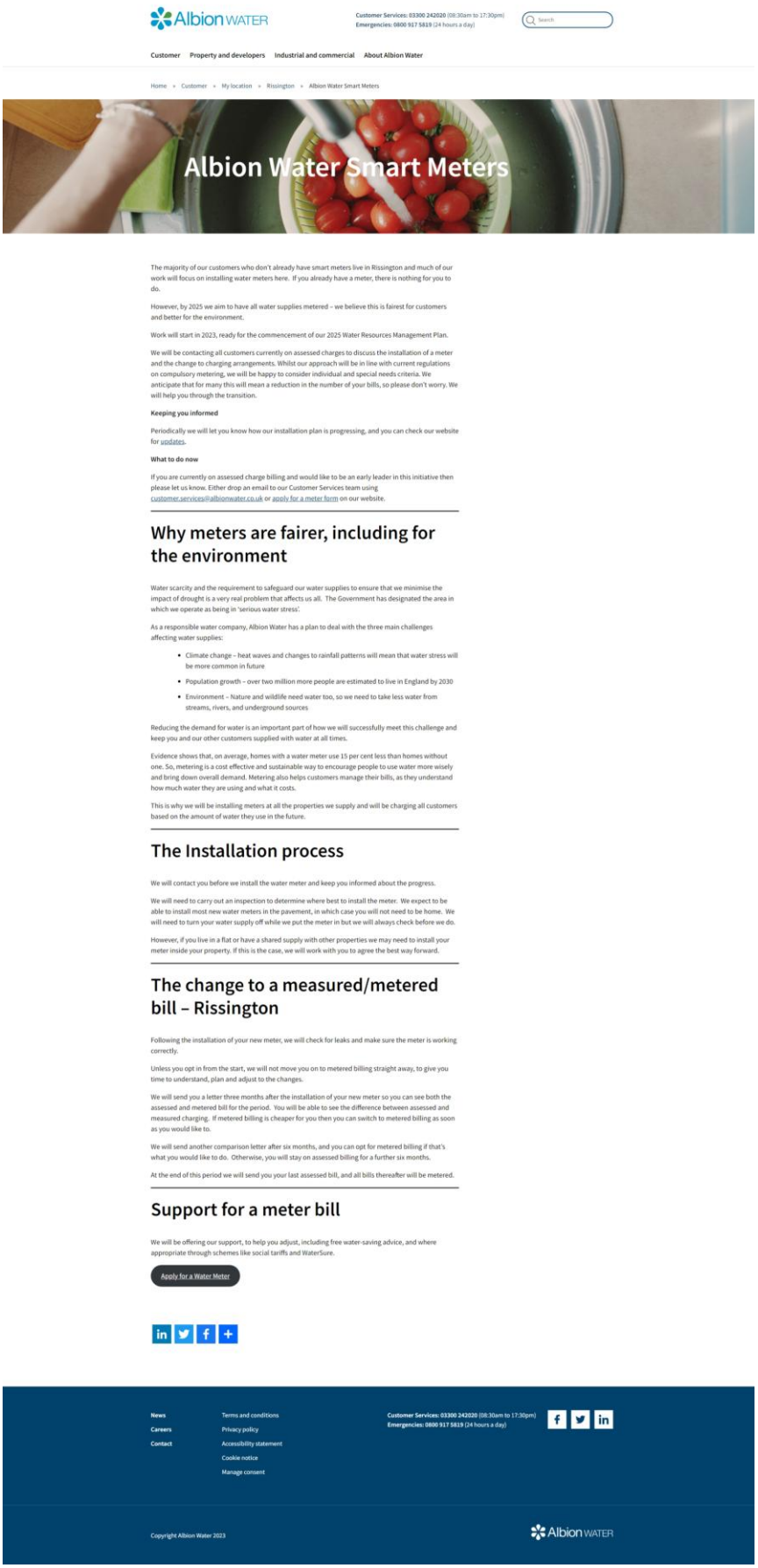

Figure 3 – Dedicated web page about metering programme

Annex 2 – Oaklands Water Resources Demand Options Appraisal [Commercial in Confidence]

With all properties smart metered, a metering programme is not an option.

With PCC at 95.67 l/p/d, enhanced demand management through customer engagement is not realistically an option because customers are already using water efficiently.

Our options are therefore; to renegotiate the bulk supply agreement and enhance leakage detection and repair.

With leakage at 35% currently, the water savings from leakage detection and repair would add significant volumes to the surplus in anticipation of demand pressures that might arise from increases in population, and or increases in PCC due to climate change.

Based on all the above, we conclude that the best value plan is to tackle leakage and continue with customer engagement to maintain consumption as low as it is currently, then renegotiate the bulk supply agreement if demand encroaches the headroom set aside predominantly for extreme events, and climate change impacts.

Annex 3 – Draft Water Resources Management Plan 2024. Section 6 – Allowing for Risk & Uncertainty, and Baseline Supply-Demand Balance[17]

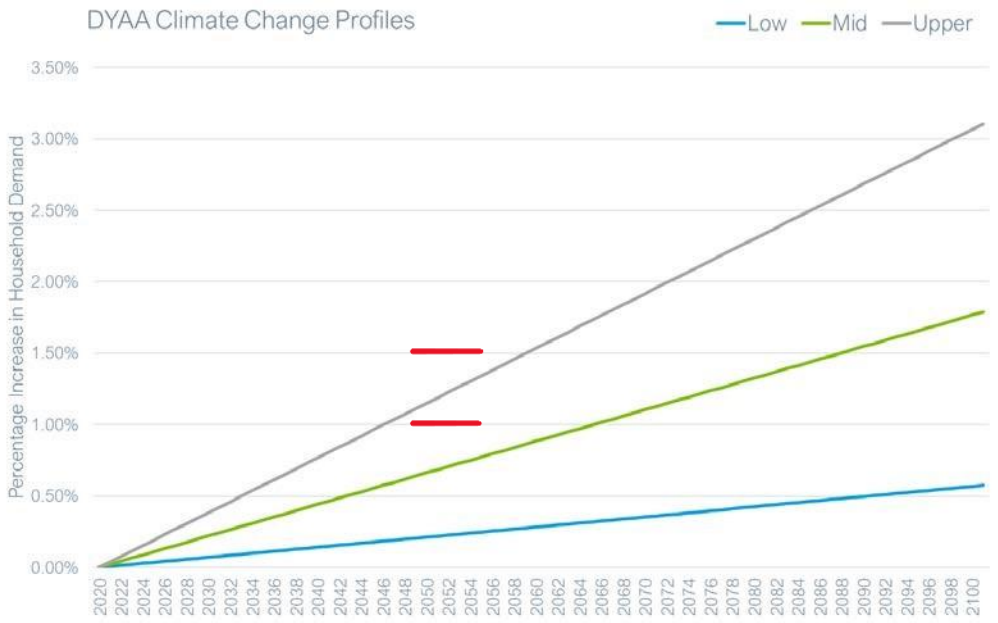

Figure 6 - 9: Impacts of Climate Change on DYAA Demand

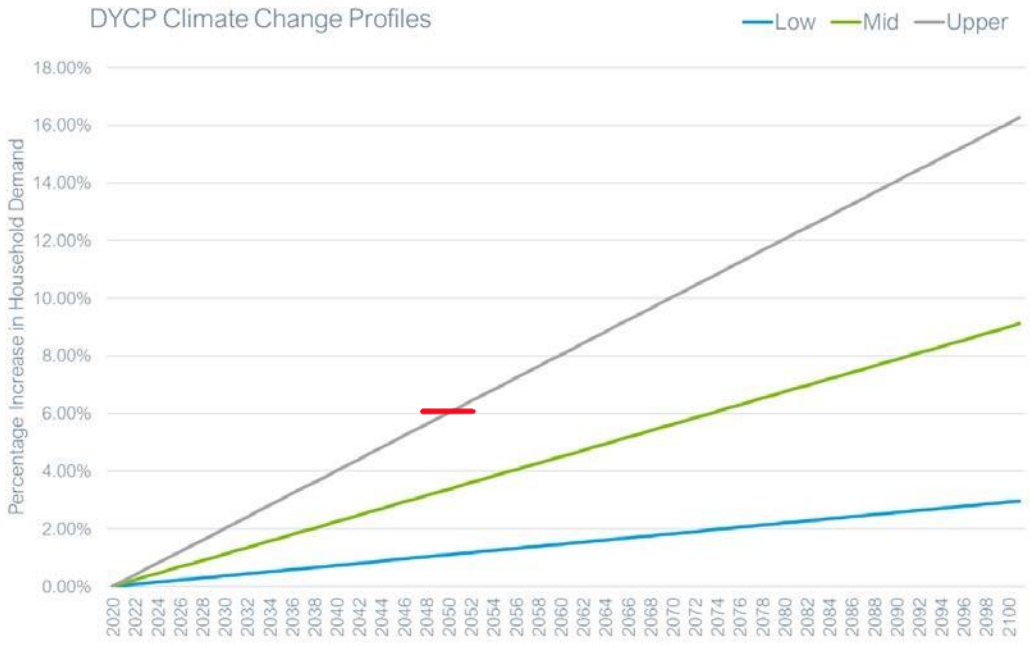

Figure 6 - 10: Impacts of Climate Change on DYCP Demand

[17] 6-Uncertainty-and-Baseline-Supply-Demand-Balance.pdf (thames-wrmp.co.uk)