ICOSA WATER SERVICES LIMITED

DRAFT WATER RESOURCES MANAGEMENT PLAN (OCTOBER 2022)

Contents

1 Introduction

1.1 Background

This is the draft Water Resources Management Plan (WRMP) 2022, for Icosa Water Services Limited ("Icosa Water" or "Company").

1.2 Icosa Water company identity

Icosa Water is a regulated water and wastewater undertaker appointed by Ofwat under its new appointments and variations process. As a new appointee Icosa Water has been granted appointments to provide water and wastewater services for certain new housing developments across the United Kingdom. Under the new appointments and variations process, Icosa Water effectively replaces the relevant incumbent undertakers and monopoly provider for each development site. Icosa Water was granted its licence and Instrument of Appointment by Ofwat which came into effect on 1 June 2017.

On 30 May 2020 Icosa Water and its parent company, Icosa Water Limited, were acquired by the Last Mile Infrastructure group of companies. The group is involved in, inter alia, the construction, adoption, operation and maintenance of utility networks (including natural gas, electricity, water and sewerage networks) and all associated infrastructure.

1.3 Inset appointments

With the introduction of competition within the water industry, and following amendments to the Water Act 2003, the opportunity was created for the existing water and sewerage companies to be replaced by independent licence holders.

New appointments and variations allow companies to offer water, sewerage or water and sewerage services within a specified geographic area instead of the existing appointee. As a result, developers and large non-household customers can choose their supplier for these services and enjoy the benefits of a more competitive market.

Inset appointments are granted by Ofwat following a period of consultation and subject to the applicant satisfying certain criteria to ensure the interests of the customers are protected.

The WRZs which are covered in this WRMP fall within the areas of five different regional incumbent undertakers, being Anglian Water Services (AWS), Affinity Water Limited (AFW), Severn Trent Water Limited (SVT), South East Water (SEW) and Southern Water Services (SWS).

Inset areas are discrete areas in which resources can be shared so that all customers experience the same risk of supply failure from a resource shortfall.

This is effectively the same as the definition of a Water Resource Zone (WRZ) and so the terms 'inset area' and 'WRZ' are interchangeable in the context of this report. Table 1.1 summarises the relevant WRZs.

Icosa Water's WRMP and Drought Plan will be reviewed annually as part of the Annual Review process and will be updated to include additional development area as the Icosa Water portfolio expands. Details of new inset areas will be published on Icosa Water's website.

Table 1.1 Summary of WRZs

Icosa WRZ	Site	Location	Services	Date Granted	Date Commenced
17-001	West Raynham	Fakenham, Norfolk	Water & Wastewater	1 April 2017	1 June 2017
17-002	Rosewood Park	Bexhill-on-Sea, East Sussex	Water and Wastewater	3 Feb 2018	3 Feb 2018
17-004	Rochester Riverside	Rochester, Kent	Water and Wastewater	31 Oct 2018	01 Nov 2018
17-005	Conningbrook Phase 1	Ashford, Kent	Water and Wastewater	11 Sept 2018	11 Sept 2018
17-007	Thetford Phase 1	Norfolk	Water and Wastewater	15 Aug 2019	16 Aug 2019
17-013	Broadland Gate	Norwich	Water and Wastewater	23 Aug 2018	24 Aug 2018
17-018	Forstal Lane	Coxheath	Water and Wastewater	14 Aug 2019	3 Nov 2020

18-004	Marden Road	Staplehurst	Water and Wastewater	14 May 2019	15 May 2019
18-015	Ospringe B	Ospringe	Water and Wastewater	11 Sept 2021	20 Sept 2021
18-022	Ulcombe Road	Headcorn	Water and Wastewater	5 Aug 2019	6 Aug 2019
18-025	Toddington Lane	Littlehampton	Water and Wastewater	18 Aug 2020	19 Aug 2020
19-005	Westridge Village	Isle of Wight	Water and Wastewater	6 Jan 2020	7 Jan 2020
19-026	Wilton Park	Beaconsfield	Water and Wastewater	19 Aug 2021	23 Nov 2021
19-038	Innsworth	Gloucester	Water and Wastewater	7 Dec 2020	8 Dec 2020
20-001	Twigworth	Gloucester	Water and Wastewater	27 Jan 2021	2 Feb 2021

1.4 Icosa Water's approach to water resources

Icosa Water does not currently own or operate water supply sources. All the demand areas will be serviced and supplied via bulk transfers from the water companies in whose area the inset will be located.

It is not currently within Icosa Water's strategic plans to develop its own water supply sources hence no planning options to develop company sources have been included in the WRMP.

Icosa Water has negotiated terms and conditions for individual bulk supply agreements with the incumbent water company for each inset area. These agreements are designed to secure adequate supplies for its customers throughout the 25-year planning period, including sufficient headroom to allow for uncertainties in demand forecasts. However, if planning permission is granted for additional development within the existing inset areas, then it may be necessary to negotiate new, or additional bulk supply agreements.

Icosa Water is committed to achieving high levels of water-use efficiency. This will involve formulating a long-term strategy with developers to achieve the targets on new domestic and commercial developments. This strategy will involve innovation and the development of strategic policies to:

- Promote efficient water use in domestic properties.
- Reduce per capita consumption from the industry average of 141 l/h/d to the government's target of 110 l/h/d.
- Develop customer communication and awareness of Icosa Water codes of practice to deliver reliable and sustainable supplies of water and wastewater services.
- Implement the latest Advanced Metering Infrastructure (AMI) for all domestic and commercial supplies.
- Manage leakage to maintain low levels at inset appointed sites.
- Consider environmental solutions and water recycling strategies to meet specific water demand requirements for each inset development.

Further discussion on water efficiency can be found in section 3.3.5.

1.5 Summary of Incumbent areas within which Icosa supplies

A summary of supply-demand information for incumbent regions within which Icosa Water delivers water supplies is set below. Site specific details are contained in Appendix C for each development site being supplied by Icosa Water.

1.5.1 Affinity Water Limited (AFW)

Icosa Water started supplying water to customers at Wilton Park on 23rd November 2021. The baseline supply-demand forecast shows that Icosa Water has sufficient supplies (via the bulk supply from AFW) to meet forecast demands until the end of the planning period.

1.5.2 Anglian Water Services Limited (AWS)

Icosa Water supplies three inset areas in the Anglian Water region. The baseline supply-demand forecast shows that Icosa Water has sufficient supplies (via the bulk supply from AWS). The forecasts consider all existing household and non-household customers; they also include 92 new households currently within the planning process for the West Raynham WRZ. Depending

on the scale of any additional development proposed an additional bulk supply and network upgrade maybe be required.

1.5.3 Severn Trent Water Limited (SVT)

Icosa Water supplies two inset areas in the Severn Trent Water region. The baseline supply-demand forecast shows that Icosa Water has sufficient supplies (via the bulk supply from SVT) to meet demands until the end of the planning period. The forecasts take all existing and planned new household and non-household customers into account.

1.5.4 South East Water Limited (SEW)

Icosa Water supplies six inset areas in the South East Water region. The baseline supply-demand forecast shows that Icosa Water has sufficient supplies (via the bulk supply from SEW) to meet demands until the end of the planning period. The forecasts take all existing and planned new household and non-household customers into account.

1.5.5 Southern Water Limited (SWS)

Icosa Water supplies three inset areas in the Southern Water region. The baseline supply-demand forecast shows that Icosa Water has sufficient supplies (via the bulk supply from SWS) to meet demands until the end of the planning period. The forecasts take all existing and planned new household and non-household customers into account. Icosa Water had previously identified a potential deficit in available supply to Rochester Riverside WRZ. This deficit has now been resolved by securing additional supply commitments from SWS.

2 The requirement for and background to the WRMP

2.1 Legal requirements

Under the Water Industry Act 1991(as amended), water undertakers have a statutory duty to prepare and maintain a water resources plan (also known as water resources management plans - WRMP). Defra and the Welsh Assembly Government expect the water companies of England and Wales to follow sections 37A-D of the Water Industry Act 1991, the Water Resource Management Plan Regulations 2007 and the directions given by government.

The WRMP is not to be confused with the company's Statutory Drought Plans. Although these plans complement each other, the drought plan sets out the short-term operational steps Icosa Water will take as a severe drought progresses, i.e. the point at which the 'Dry Year' scenario it uses for long-term planning is exceeded due to extreme dry weather events.

The statutory process for the preparation of water resources management plans sets out defined stages for consultation. The three principal consultation stages are:

- Pre-draft consultation with statutory consultees and licenced water suppliers.
- Consultation with the Environment Agency's regional planners, and with the Water Services Regulation Authority (Ofwat) Reporter during the preparation of the draft WRMP.
- Consultation following publication of the draft WRMP with specified organisations (including its Regulators and local authorities), with Icosa Water's customers, and with anyone else who is likely to be affected by the plan.

Stakeholders' comments (Representations) on the draft WRMP are submitted to the Secretary of State who forwards them to the Company. The Company is required to produce a "Statement of Response" to those representations setting out:

a. The consideration that have given to those representations.
b. Any changes that have made to the Draft WRMP as a result of consideration of those representations and the reasons for doing so; and
c. An explanation where changes have not been made as a result of representation.
d. Subject to review of the Statement of Response, the Secretary of State may direct the Company to make further changes to the draft Plan, to publish the Final WRMP, or may direct the Plan to public inquiry.

2.2 Background

Following pre-consultation, Icosa Water prepared a draft WRMP that was submitted to the Secretary of State in December 2017. With the agreement of the Secretary of State, this draft Plan was published for public consultation in March 2018.

As part of the public consultation, copies of Icosa Water's draft WRMP were sent to Defra, Ofwat, the Environment Agency, the Drinking Water Inspectorate, Natural England, and the relevant local authority. The draft Plan was also published on Icosa Water's website.

Representations (comments) on the draft WRMP were received from the Environment Agency and Ofwat via the Secretary of State. As required by the Water Industry Act, Icosa Water prepared a "Statement of Response" to the representations received which was submitted to the Secretary of State on 15 September 2018.

As required by the Act, the Statement of Response sets out:

- The consideration that Icosa Water gave to those representations; and
- any changes that would be made to the Draft WRMP as a result of consideration of those representations and the reasons for doing so.

The WRMP included the changes set out in the Statement of Response or explains why no change has been made.

2.3 Commercial confidentiality and security

As part of the formal statutory process Icosa Water is required to undertake a review of commercial confidentiality and security considerations. Prior to the publication of its draft Water Resources Management Plan, Icosa Water wrote formerly to the Secretary of State to confirm that at the time of submitting its draft plan under s37B (1)(a) of the Water Industry Act 1991, revised by the Water Act 2003:

i. Icosa Water would not be submitting a statement in accordance with s.37B (1) (b) of the Act.
ii. Icosa Water provided a statement of compliance to the Secretary of State confirming that the draft water resource management plan had been prepared in accordance with requirements of The Control of Sensitive Water Company Information – Advice Note 11 Edition 1 DEFRA Nov. 06 and EKP Document Designation Handling and Storage Advice Note 2 DEFRA Nov. 06.

2.4 Water Resource Management Plan (WRMP)

A WRMP sets out how a water company intends to maintain the balance between the supply and demand for water over a 25-year period. It shows how a company expects the demand for water to vary over the planning period and how it plans to meet those forecast demands. A water company is expected to describe its present position, how it got there and provide evidence to support its proposed plan. It must provide economic, social and environmental justification for its preferred set of options for water management to meet forecast demand.

Given that the future company business plan is for expansion of new development sites across all regional water company areas, Icosa Water will review the published version of the WRMP on a yearly basis in accordance with the Annual Review guidance.

2.5 Icosa Water's strategy

Icosa Water negotiates bulk supply agreements with incumbent water companies with the intention of ensuring there will be a surplus across the whole of the planning period.

Icosa Water's Strategy for maintaining a positive supply-demand balance can be summarised as follows:

- Monitor actual demand as sites are developed to their full potential.
- Implement a programme of active leakage monitoring and control to maintain levels of leakage at, or close to, the economic level.
- Implement efficiency measures to reduce per capita consumption to target levels consistent with the aims and objectives as agreed with developers.
- Monitor available headroom to ensure that this does not fall below target headroom objectives.
- If available headroom falls below target headroom, consider options to eliminate the supply-demand deficit. This will entail one or more of the following:
    - increase the quantities specified in bulk supply agreements.
    - implement demand management measures if these have not yet reached their optimum level of performance.
- In the event of a drought, Icosa Water will follow the steps set out in its Drought Plan.

2.6 Levels of Service

A water company's target level of service is the standard of service (effectively the reliability of supply) that a customer can expect to receive. It is a form of contract between a water company and its customers. Icosa Water has published the company levels of service on its website and to date has had no adverse comments from its customers.

Guaranteed Standards of Service have been agreed with Ofwat.

A water company's success in delivering its stated levels of service over a period of time depends on the combined effectiveness of its WRMP and Drought Plan.

It is accepted within the water industry is not economical or environmentally sustainable, to develop long-term plans which completely remove the need to periodically introduce restrictions on customer's non-essential use during more extreme drought events.

The target level of service is therefore the average frequency with which restrictions on water use is expected to be applied to customers. This frequency should be considered appropriate both in terms of customer expectation, impact on the environment and cost implications.

The quantity of water to be supplied under the bulk supply agreements allow for unconstrained demand in each WRZ to be supplied both now and in the future. However, the agreements also allow for reductions in bulk supply to be applied during times of drought. It might be considered unreasonable if supplies to Icosa Water customers remained unconstrained while the incumbent's customers who rely on the same supply source were subject to drought restrictions. Icosa Water's levels of service will therefore be effectively aligned to those of each incumbent as set out within their WRMPs and as shown in Table 2.1 below. These are the restrictions on water use that Icosa Water will apply as drought severity increases:

Table 2.1 Levels of Service for Security of Supply for Icosa Sites

Icosa WRZ Site	Frequency of Implementation (Drought Severity)		
	Action		
	Introduction of Temporary Use Ban	**Use of Drought Orders**	**Imposition of the use of standpipes and rota cuts**
17-001 - West Raynham	10% >1 in 10 years	2.5% 1> in 40 years	>1 in 200 years 1% until 2024/25 >1 in 100 years 0.5% from 2025/26
17-002 - Rosewood Park	10% risk >1 in 10 years	2.5% 1> in 40 years	0.5% risk >1 200 years
17-005 - Conningbrook Phase 1	10% risk >1 in 10 years	2.5% >1 in 40 years	0.5% risk >1 200 years
17-004 - Rochester Riverside	40% risk >1 in 10 years	22% risk >1 in 10 years	When necessary

17-007 - Thetford Phase 1	10% >1 in 10 years	2.5% 1> in 40 years	>1 in 200 years 1% until 2024/25 >1 in 100 years 0.5% from 2025/26
17-013 – Broadland Gate	10% >1 in 10 years	2.5% 1> in 40 years	>1 in 200 years 1% until 2024/25 >1 in 100 years 0.5% from 2025/26
17-018 – Forstal Lane	10% risk >1 in 10 years	2.5% >1 in 40 years	0.5% risk >1 200 years
18 -004 – Marden Road	10% risk >1 in 10 years	2.5% >1 in 40 years	0.5% risk >1 200 years
18 -015 – Ospringe B	10% risk >1 in 10 years	2.5% 1> in 40 years	0.5% risk >1 200 years
18 – 022 – Ulcombe Road	10% risk >1 in 10 years	2.5% >1 in 40 years	0.5% risk >1 200 years
18 – 025 – Toddington Lane	40% risk >1 in 10 years	22% risk >1 in 10 years	When necessary
19 – 005 – Westridge Village	40% risk >1 in 10 years	22% risk >1 in 10 years	When necessary
19 – 026 – Wilton Park	10% >1 in 10 years	2.5% 1> in 40 years	Deemed unacceptable (p145 plan linked)
19 – 038 – Innsworth	2.5% risk >1 in 40 years	N/A (<0.01%)	Deemed unacceptable (p6 plan linked)
20 – 001 - Twigworth	2.5% risk >1 in 40 years	N/A (<0.01%)	Deemed unacceptable (p6 plan linked)

If a WRZ is in deficit, the actual level of service that customers experience is likely to be below a water company's target level of service. If a resource zone is in surplus, then the level of service will be above the target level. The risk to Company levels of service is assumed to be minimal when all WRZs are in supply-demand balance. Further details of the situation in each WRZ are given in section 4.

2.7 Current situation regarding development of supply areas

Table 2.2 shows the current number of connections transferred at the end of August 2022 together with projected long-term development proposals by the current management company for each WRZ.

Table 2.2 Current stage of development at Icosa Water sites

Icosa Water Ref No	Site	Number of Connections				Current Development Stage (%)
		Domestic		Non-Household		
		Current	Ultimate	Current	Ultimate	
17-001	West Raynham	172	263	20	20	65%
17-002	Rosewood Park	329	341	5	5	97%
17-004	Rochester Riverside	375	1400	6	6	27%
17-005	Conningbrook Phase 1	199	500	0	1	40%
17-007	Thetford Phase 1	145	343	0	0	42%
17-013	Broadland Gate	0	0	12	39	31%
17-018	Forstal Lane	199	210	0	0	95%
18-004	Marden Road	238	250	0	0	95%
18-015	Ospringe B	56	123	0	0	46%
18-022	Ulcombe Road	149	220	0	0	68%
18-025	Toddington Lane	61	910	0	0	7%
19-005	Westridge Village Phase 1	80	80	0	0	100%
19-026	Wilton Park	99	500	0	0	20%
19-038	Innsworth	153	1300	0	0	12%
20-001	Twigworth	53	725	0	0	7%

Notes:

- Current refers to the actual numbers of connected customers at the end of August 2022
- Ultimate refers to the expected number of connections at full build-out

2.8 Icosa Water's WRMP for inset development areas

This WRMP has been prepared to comply with the statutory requirements of the Water Resources Management Plan Regulations 2007, issued by the Secretary of State in exercise of the powers conferred by the Water Act 2003, in accordance with the Water Resource Planning Guideline (WRPG) issued by the Environment Agency in April 2007, and subsequent updates and revisions.

In preparing this WRMP, Icosa Water has referred principally to the following documents with their accompanying appendices and notes:

- The legislative requirements for water companies to prepare and maintain a water resources management plan as set out in the Water Industry Act 1991 (as amended by the Water Act of 2003), and subsequent directions and regulations including the Water Resources Management Plan Regulations 2007, and the Water Resources Management Plan (England) Direction 2022.
- the latest WRMP Guidelines version 10 as published on 4 April 2022 and updated on 22 July 2022.
- the most recent WRMP tables version 1 as released in August 2022 and updated in September 2022.
- Anglian Water Services' "Water Resources Management Plan", 2019.
- South East Water's "Water Resources Management Plan 2020 to 2080", 2019.
- Southern Water Services' "Water Resource management Plan", 2019.
- Affinity Water's "Water Resources Management Plan", 2019
- Severn Trent Water's "Water Resources Management Plan", 2019

In preparing this WRMP, Icosa Water has specifically focused on:

- Establishing the demand balance for the development and assessing whether additional water resources might be needed within the plan's lifetime.
- Ensuring Icosa Water meets its statutory duties to put in place resilient and cost-effective plans to meet its customers' needs in the coming years.
- Ensuring Icosa Water operates in an environmentally and socially sustainable way so that it does not prejudice the needs of future generations.

The plan is in effect a stand-alone document that provides a realistic strategy for managing water resources, setting out clearly the data and assumptions used to support and justify the preferred strategy adopted by Icosa Water.

2.9 The scope of the plan

The April WRMP guidance document contains a detailed recommended structure when developing a water resources management plan.

The main components of a water resources management plan are as follows:

- considering the continuity of the plan with previous WRMPs and highlight any changes against previous plans.
- forecast how much water, on a sustainable basis, Icosa Water has available to supply its customers each year over the chosen planning period, for a minimum of 25 years.
- forecast how much demand there will be for water each year over the same period.
- allow for uncertainty in the calculations and forecasts.
- compare supply with demand (including uncertainty) and see if there is a surplus (more supply than demand) or a deficit (less supply than demand). If there is a deficit Icosa Water must identify options to increase supply or reduce demand to achieve an environmentally sustainable secure supply of water.
- if you there is no deficit to consider options to supply other water companies or regional groups, other sectors and to ensure efficient use of water.
- consider the risks to the supply-demand balance that Icosa Water may face and future uncertainties across the planning period.
- produce a best value plan.

As mentioned in section 2.4, the principle source of company supplies will be provided by bulk transfers/cross border supplies from incumbent water companies and not from Icosa Water's own sources.

The major source of carbon emissions is associated with above ground assets in the production delivery and distribution input of treated water. Icosa Water does not produce, own or operate any above ground related water assets which would impact on climate change and therefore has not taken this aspect into account when developing the WRMP

Icosa Water recognises the importance to the environment and consequential impact of carbon emissions associated with the production and operation of a treated water supply network. As

part of its diligence in producing its WRMP Icosa has consulted with regional incumbents in terms of their overall assessment of greenhouse gas emissions associated with current NAV licensees.

The estimate of incumbent's "company" greenhouse gas emission values is shown in table below. From this is calculated the max TC02e per ML/day associated with each bulk supply water resource zone, for the planning period based on expected demands.

Table 2.3 Estimate of carbon emissions

	Incumbent	Maximum Contracted Bulk Supply / Ml/Yr	Baseline Demand 2021/22 / Ml/day	Estimated Incumbent Carbon to Treat & Supply Water / TCO2e	Estimated Icosa Carbon for Operation of Network / TCO2e	Total Carbon to Supply Water / TCO2e	Total Emmissions to Supply WaterTCO2e/ML	Icosa Emmissions / TCO2e/Ml
	Affinity Water	397.70	0.017	14.19	1.20	16.075	0.233	0.027
	Anglian Water	226.70	0.099	7.56	2.40	9.96	0.044	0.038
	Severn Trent	715.5	0.028	46.15	1.20	47.992	0.217	0.008
	South East Water	640.9	0.246	18.80	3.60	22.40	0.215	0.006
	Southern Water	565.15	0.104	13.47	3.60	17.07	0.361	0.013

Incumbents have confirmed that they have developed Investment and operational strategies to mitigate and reduce the impact of carbon emissions within the development areas over the duration of the planning period.

Icosa Water will continue to work closely with the incumbents to reduce greenhouse gas emissions through demand management and continue to review the impact that climate change has on its operating position. Any reduction in CO2 arising from demand management initiatives by Icosa Water over the period of the plan will be reflected in the incumbent's sustainable carbon emission valuations.

Because the source of supplies to the current WRZs are via bulk supplies, there is no requirement for Icosa Water to carry out a deployable output assessment, nor any associated assessment of how sustainability reductions or the impact of climate change might affect supplies.

Generally, the maximum quantity of water allowed for in bulk supply agreements is aimed at ensuring that no deficits in the balance between supply and demand occur within the 25-year planning period. As a result, an appraisal of options to remove the deficit is not required. However, this conclusion is dependent upon the reliability of the baseline demand forecast. It is also dependent upon the granting of planning permission for further development.

At this stage in Icosa Water's development, there is very little usable information on most of its sites on water consumption to enable Icosa Water to robustly identify differences in patterns of use by customers. This information will be collected over time and will become available for future input on which to base demand forecasts. Forecasts of demand have therefore been based on industry averages and values measured, observed, or forecast within the supply areas of the incumbent water companies. A headroom allowance has been added to the demand forecasts to allow for uncertainties in the supply-demand forecasts.

As the risk of supply shortages is low and data on actual demand or leakage is lacking, the plan has been kept relatively simple. However, supply-demand balances have been defined, and a structure of reporting set out. Monitoring systems are in place so that annual reviews, and subsequent versions of the WRMP can utilise actual demand/consumption and leakage data as they become available to refine the estimates and assumptions made in this report.

3 The supply-demand balance

3.1 Introduction

This section describes the general methodology used to compute the supply-demand balance, the data available and the assumptions made. Detailed balances for consolidated WRZ for each regional incumbent covered by this plan are presented and discussed in section 4. These will need to be revisited as data on actual consumption and water delivery become available. Assumed or estimated values can then be substituted with actual data. The opportunity to do this arises with each annual review of the plan and with a new and revised plan due after five years.

3.2 Deployable output

Icosa Water does not own or operate water supply sources of its own. All supplies come from bulk transfers from the incumbent water companies – in this case AFW, AWS, SVT, SEW and SWS. There are no exports out of Icosa Water supply areas.

In general, the quantities of water to be made available in each WRZ has been negotiated with AFW, AWS, SVT, SEW and SWS such that no supply-demand deficit is envisaged within the 25-year planning horizon subject to any exceptions identified in Section 4 below. Quantities are based on estimates of the total water requirement (baseline demand and operating losses) in the inset areas at projected final development, i.e. after the whole of the proposed development is complete.

Quantities are defined in terms of an annual maximum volume in m3/year, a maximum daily volume in m3/day and a maximum instantaneous flow in l/s. Values are set out in the bulk supply agreements concluded between Icosa Water and AFW, AWS, SVT, SEW and SWS, for the inset areas. The agreed limits for each WRZ are summarised in Table 3.1.

When expressed as a daily rate, the maximum annual volume represents the average rate of transfer that can be maintained over the year. There are peaks of demand within this, normally in summer months and/or dry years when high temperatures lead to temporary highs in consumption. The maximum allowable daily transfer is at a higher rate than the annual volume to take these peaks into account.

The maximum daily and annual volumes will be supplied by the relevant regional incumbents under bulk supply agreements save in exceptional circumstances when supplies could be reduced. A bulk supply agreement is executed by Icosa Water and the regional incumbent for each development site to be supplied with potable water.
In 2020, the Water Services Regulation Authority (Ofwat) required water undertakers to use an industry drafted model agreement for the provision of bulk supply services. This has eliminated the need for NAVs to negotiate different terms with different regional incumbents, based on their own templates. The industry approved version of the bulk supply agreement comprises the core terms contained in Part 1 and optional provisions contained in Part 2 of the model agreement. Each agreement commences on the relevant commencement date and continues until either party terminates the agreement for reasons set out in the core terms.

Regional incumbents are entitled to reduce bulk supplies in cases of emergency or 'Force Majeure'. Droughts are considered emergency events and like force majeure events are regarded by incumbents as being out of their reasonable control. Bulk supply agreements would typically define emergency events broadly as *"any circumstances beyond the reasonable control of Supplier whereby the water supply to Icosa and/or to Supplier's customers in the same area as the Site is limited or unavailable because of burst, plant or process breakdown, drought, pollution, flood or otherwise.*"

In the bulk agreements regional incumbents have a duty to always supply potable water at the bulk supply point and at the agreed volumes, save in the event of an emergency where supplies could be curtailed. Any reduction in supplies to Icosa must be proportional to the constraint in supplies to an incumbent's own customers.

These agreements require Icosa Water to apply the same restrictions to its customers if the relevant regional incumbent water company imposes restrictions on its own customers. A contractual obligation is imposed on Icosa Water under the bulk supply agreements to adhere to the restricted supplies during a drought.

To ensure that Icosa Water can effectively communicate potential restrictions to customers and manage any actual restrictions imposed, the bulk supply agreements require the regional incumbent water company to effectively communicate any potential reductions in supply to Icosa Water (and hence its customers), the circumstances giving rise to such potential reductions and the anticipated length of time for which any such reductions are expected to occur.

There are core terms in the above-mentioned agreements that place communication obligations on parties during drought conditions:

"9.15 In the event that the Water Company considers it necessary to make a hosepipe ban or other restrictions on the use of water as may from time to time be applied to the Water Company's customers in the area surrounding the New Appointee's area of appointment as a water undertaker, the New Appointee shall take all steps necessary to impose upon its customers a hosepipe ban or other restrictions. The Water Company shall give such notice to the New Appointee as is reasonable in the circumstances where it proposes to introduce such restrictions.

9.16 Where the Water Company is proposing to apply for an ordinary or emergency Drought Order that will restrict the use of water in the area surrounding the New Appointee's area of appointment as a water undertaker it shall notify the New Appointee of its intention. The New Appointee shall take all necessary steps to apply for an ordinary or emergency Drought Order in equivalent or at its option more stringent terms to that applied for by the Water Company and impose restrictions on the use of water by its customers no less than those applied by the Water Company to its customers. The Water Company shall give such notice to the New Appointee as is reasonable in the circumstances where it proposes to apply for an ordinary or emergency Drought Order and the terms sought."

Table 3.1 Agreed limits to the bulk supply

Icosa Water Ref No	Site	Maximum instantaneous flow l/s	Maximum daily volume m^3/day	Maximum annual volume Ml/year	Average daily flow l/sec
17-001	West Raynham	6.9	197	71.9	0.74
17-002	Rosewood Park	10.0	189	69.1	0.78
17-004	Rochester Riverside	15.9	605	220.8	0.98
17-005	Conningbrook Phase 1	9.2	540	197.1	0.53
17-007	Thetford Phase 1	7.6	290	105.9	0.48

17-013	Broadland Gate	16	142	52	0.05
17-018	Coxheath	4	345	126	0.55
18-004	Staplehurst	4	345	126	0.67
18-015	Ospringe	3	259	95	0.11
18-022	Headcorn	6	78	28	0.40
18-025	Toddington Lane	14	606	221	0.08
19-005	Westridge Village	0.9	78	28	0.18
19-026	Wilton Park	13	303	111	0.20
19-038	Innsworth	17	1073	391	0.30
20-001	Twigworth	14	888	324	0.03

Notes;

- Average Daily Flow (l/s) data is based on actual consumption data available to date.

3.2.1 Outage

Outage is a temporary, short-term loss in deployable output caused by unforeseen or unavoidable events affecting any part of the water supply system (e.g. boreholes, intakes, pumping stations, treatment works or mains distribution system). The basic method for calculating outage was set out in the UKWIR publication entitled "Outage Allowances for Water Resources Planning" Ref 95/WR/01/3, published August 2003.

Types of event that can be included in an outage allowance; include the following unplanned events:

- Water Quality failure
- Treatment system failure
- Power failure
- System failure

The supply failure would normally last at least 24 hours before being considered a legitimate outage event. However, interruptions longer than 3 months would be considered reductions in deployable output rather than outage.

Icosa Water does not operate any sources or treatment works; therefore, the majority of the outage events listed above will originate in the system upstream of the point of connection for the bulk supply.

These types of events will therefore be considered in the incumbent water companies' assessment of WAFU, but not Icosa Water's. Any uncertainties relating to the reliability of the bulk transfers are allowed for under Target Headroom.

3.3 Demand

In line with Government policy, all new properties will be metered using the latest AMI metering technology for domestic and commercial supplies.

Table 2.2 shows the number of properties that have been connected by August 2022. In regard to properties that aren't metered, Icosa Water assumes that these properties will eventually be metered – the following options will be considered:

- apply for permission to compulsory meter the properties (this is possible as West Raynham is in an area categorised as being in "serious water stress").
- meter the properties for data monitoring purposes, but continue to charge on an unmeasured basis; or
- wait for change of occupancy.

Icosa Water installs meters on all its new sites. The only exception is West Raynham where 25 existing properties were unmetered.

Existing data on water consumption is heavily influenced by the significant volumes of water used during construction at each site for building supplies, concrete batching plants, water mains testing, commissioning of wastewater networks, road sweeping, dust suppression and gully cleaning.

A reasonable period of 'normal' consumption is needed, free from construction activities, before usable data on actual consumption can be obtained. In the meantime, where such data is not available Icosa Water has used consumption data provided by the incumbent water companies for the areas in which the Icosa Water WRZs sit (see the assumptions on each WRZ in sections 4.2 and 4.3). Household consumption data for both incumbent water companies is based on micro-component analysis.

3.3.1 Domestic demand

In general, there is a tendency for underlying domestic demand to increase each year due to the following factors:

- Improving lifestyles – our lifestyles are becoming increasingly convenience-based with more use of washing machines, dishwashers, and we take more baths and showers. Our leisure activities, particularly in the garden, also create increased demand for water.
- Smaller households - We are also increasingly living in smaller numbers in homes. Less people in homes use more water per person than larger families.

This underlying trend is offset by the greater efficiency in water use achieved by

- New designs in buildings and appliances
- Water saving devices
- Individual metering reducing consumer consumption patterns
- Reduced leakage due to new network asset

Domestic demand is estimated as the product of the number of properties times an assumed occupancy rate (currently assumed to be 2.4 which is consistent with ONS figures) times per capita consumption (pcc – expressed in litres/head/day or l/h/d). The Government's water strategy for England (February 2008) sets out a vision for the year 2030:

"*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 technological developments and innovation.*"

As the great majority of construction in Icosa Water inset areas has occurred after October 2017, new housing should be built to the new housing standard for each incumbent. It might be expected that over time, and with Icosa Water's commitment to aim for the highest levels of water efficiency, it will be possible to achieve lower pcc rates. For arriving at bulk supply agreements, Icosa Water has assumed a constant pcc of 130 l/h/d for domestic demand throughout the planning period. For the purpose of this WRMP, Icosa Water has based its demand forecasts on data obtained from the incumbent water companies (see the assumptions set out in sections 4.2 and 4.3). Whether or not this level of efficiency is being achieved will become clear when data from domestic meters become available.

The number of domestic connections at full development in the inset area has been defined by the developers (Table 2.2) although in the case of future development areas there will be uncertainty about the rate of development and when full build-out will be achieved. This will depend on the rate of house sales which in turn will depend to a large extent on the 'economic recovery' and the state of the national and local economies.

The assumed rates of new development can be found in sections 4.2 and 4.3. However, these will depend on the size of the overall developments. This rate will undoubtedly vary from year to year but as it is thought that the development of new sources of supply within the planning period will not be necessary, the rate of house building is not critical unless additional bulk supply connections need to be made.

With the number of domestic and commercial properties at full development already known, the only uncertainty in numbers of population served is in the rate of occupancy. With smaller families and a tendency for more people to live alone, occupancy rates across the country are falling. Occupancy rates within the inset areas are not known. For planning purposes, we have used occupancy rates based on data provided by the incumbent water companies (see sections 4.2 and 4.3).

As more consumption information becomes available, Icosa will be able to more accurately forecast demand for each WRZ and compare with the incumbent water companies' forecasts.

To the extent that the data has been available, the estimation of domestic demand has been based on the aggregation of actual metered data collected during the dry weather conditions that manifested in the summer of 2022. Where data has not been available Icosa Water has used 130 l/h/d.

3.3.2 Commercial demand

There are a total of 61 commercial properties connected at Icosa developments all of which for the purpose of the final WRMP, many are considered to have demand profiles lower than the equivalent domestic demand as they are small cottage industry type units with little or no usage other than for toilets and washing facilities. The exception to these is a care home, which is located on the Rosewood Park site and a Travelodge, which is located on the Rochester Riverside Site.

For any future developments where, commercial entities will be serviced by Icosa Water, industry demand modelling values for commercial developments related to internal floor area and the number of people working or living there will be used. Where actual demands are known due to the specific nature of the commercial build then Icosa Water will use this data to calculate supply and demand values. The property mix can vary enormously, as can water consumption expressed per person or per square metre. Commercial demand will therefore need to be calculated separately for each WRZ.

3.3.3 Impact of climate change on demand

The consensus is that in South East England, climate change will result in hotter and drier summers and warmer wetter winters. This is likely to result in higher consumption through people taking more showers and baths and watering their gardens more. All Icosa Water's current sites that lie in the South of England will likely be affected by these changes which could see an increase in demand of up to 3% (SEW).

Such increases are small in relation to the uncertainties in pcc at these developments. A small allowance has been made in the calculation of target headroom for this uncertainty in demand.

3.3.4 Water efficiency

As stated in section 1.3, Icosa Water is committed to achieving high levels of water-use efficiency. Water efficiency is an integral part of resource planning and Icosa Water has a statutory duty to promote the efficient use of water. Key to this is support for customer behavioural change. Icosa Water believes that it is important to support and assist customers with these changes and this will be the key strand of Icosa Water's work during the planning period along with promoting its environmental policy objectives.

Icosa Water provides information on its web site which sets out water efficiency guidance focusing on education, advice and raising awareness.

Icosa Water will work with developers to ensure all new buildings are designed with water efficiency in mind.

The effects of Icosa Water's water efficiency programme are reflected in its demand forecast as follows:

- The pcc for new properties is consistent with the incumbent water companies plans.
- Icosa Water will work with customers in the older housing stock in the West Raynham WRZ over the planning period to ensure pcc does not rise despite lifestyle pressures.

The effect of metering on the pcc of the older housing stock in the West Raynham WRZ will be monitored. As more data becomes available over the next five years, the potential for a more proactive water efficiency programme will become evident. Icosa Water will report on this in the Annual Reviews of its WRMP.

3.4 Leakage

In their guidance for the 2019 Periodic Review, Ofwat are challenging companies to set stretching leakage performance commitment levels to:

- achieve forecast upper quartile performance (in relation to leakage per property per day and leakage per kilometre of main per day) where this is not being achieved – or justify why this is not appropriate.
- achieve at least a 15% reduction in leakage (one percentage point more than the largest reduction commitment at PR14) – or justify why this is not appropriate; and
- achieve the largest actual percentage reduction achieved by a company since PR14 – or justify why this is not appropriate.

Companies are also required to justify their leakage performance commitments relative to the minimum level of leakage achievable.

A requirement to use the method described in Consistency of Reporting Performance Measures (UKWIR 2017) is set out in the Water resources planning guideline (as updated on 22 July 2022)

Some degree of leakage from the distribution network is unavoidable. It may occur from storage facilities, transmission mains and distribution mains (often called ‘distribution’ or ‘company-side’ losses) or from service connections up to the customers’ meter (sometimes called USPL or ‘Underground Supply Pipe Leakage’). The latter are also referred to as ‘customer-side losses’ or background losses.

Leakage is normally the largest component of losses from a water supply system, but it is not the only component. Illegal connections may constitute real losses from the system while meter

inaccuracies may give rise to ‘apparent’ losses. Together with leakage, these ‘real’ and ‘apparent’ losses make up the ‘unaccounted-for water’ component (UFW).

Leakage performance can be expressed in several ways:

- Customer-side leakage is often expressed in litres/property/day (l/prop/d).
- Total leakage (losses from the distribution system plus customer side leakage) may be more appropriately expressed in m3/kilometre/day.

The former allows for different densities of housing while the latter takes account of the length of distribution main from source to customer. Leakage is also often expressed in terms of the percentage of water put into distribution. All these indicators can be useful for comparing the performance of similar systems although care must be taken when comparing values from different systems or areas with widely varying characteristics.

In its inset applications, Icosa Water has assumed target rates for “unaccounted-for-water” of 5 to 10 percent of distribution input (DI). Most of this will be leakage and the terms ‘leakage’ and unaccounted-for water’ are taken as synonymous in the context of its supply-demand balance. UFW rates as low as 5% will be difficult to achieve, except perhaps initially when all the properties and pipe connections are new.

As the network ages, leakage rates are likely to rise. However, Icosa Water is currently installing technology across its sites to monitor flows and pressure. This technology will provide Icosa Water with on-demand data to assess network performance and condition to minimise UFW. This provides Icosa Water with necessary intelligence to act in response to leakage indicators and to target network repairs.

Some development sites are now starting to provide meaningful data in terms of demand balance hence meaningful assessments of unaccounted for water. Customer side background losses (leakages on customer owned supply pipes) will be difficult to estimate at this stage at least until Icosa Water has a sufficient portfolio size to render it economically justifiable to deploy a permanent leakage detection team to carry out routine customer side supply pipe leakage assessments.

Over the next five years, the Company will carry out a review of available data and will consider the most appropriate methodology for estimating the level of unaccounted for water in the supply-demand balance. Progress will be reported in Icosa Water’s Annual Review of its WRMP. In the meantime, regular monitoring of demands and trends in readings from bulk meters will continue.

Initially, calculation of UFW is likely to be simplistic based on assumed night-time usage, metered volumes supplied to customers and volumes received via the bulk supplies.

In older systems, approximately 30% of leakage is thought to come from customer' supply pipes. With a fully smart metered network, detection of supply pipe leakage should be identified more rapidly. Icosa Water has not currently included an allowance for underground supply pipe leakage (USPL) in its WRMP tables. As more data becomes available the figures for USPL can be reviewed and demand forecasts updated as part of annual reviews of the WRMP. Meanwhile, Icosa Water will work with customers to ensure that supply pipe leakage is identified and dealt with early.

Leakage control is managed within each inset area under the responsibility of the Associate Director: Operations and Quality.

It is anticipated that in the longer term a dedicated leakage management team will be suitably structured dependant on infrastructure and assets. At this time, any leakage identified on the new network will be dealt with on a reactive basis.

All personnel engaged in working on water networks system will be competent i.e. authorised, trained, and accredited to the appropriate hygienic standards and in possession of the National Water Hygiene card.

Each WRZ will have leakage targets agreed based on an appraisal of the levels of leakage for that supply area.

The assessment considers all supply, demand and environmental issues appropriate for the individual WRZ.

The requirements for additional supporting functions for the management and control of leakage have not been fully identified at this stage.

It is anticipated that support for the maintenance of telemetry and instrumentation equipment will be outsourced. These will be progressed on a contractual basis.

Water balance – Icosa Water will undertake a regular water balance of its distribution network using data extracted from data loggers installed on the bulk meter or as provided by the incumbent pursuant to its contractual obligations.

AMI – All new customers within the Icosa network will be metered using AMI metering web-based technology. Remote metering technology employed will provide for close management of night flows through the meters enabling the rapid identification of changes in patterns of use or potential

bursts in the system. Domestic leakage can be detected by leakage alarms triggered during meter reading downloads.

Data software - Arad Metering Services software enables the transfer of data onto Icosa Water billing system and records details of metered consumption usage and trending of total night lines.

Leakage City-Mind is an automated application designed to calculate leakage and manage leakage targeting and activity at DMA level. Its prime source of corporate information will be from logger data and site information. The application will calculate the net flow in each WRZ to determine daily demand and night flow figures. Standard leakage methodologies are used to convert values to rolling weekly and monthly summaries used for leakage reporting.

Network Records

Asset Information System is a graphical asset information system (GIS) holding records of the company's mains and underground assets. Records will be held on the company's geographical system for operational and customer enquiries.

Records of all strategic, boundary, isolating valves, and their mode of operation are clearly marked and referenced on GIS along with hydrants PRV/NRV and other operating assets.

LCA (Leakage Control Areas). All assets within each LCA are clearly defined within the boundary area and shown on GIS and assigned to a WRZ.

AZNP (Average Zone Night Pressure). The night pressure at the average property height within the WRZ will be identified on GIS as a reference point for pressure management purposes.

Records of leakage investigation and activities by WRZ will be recorded on leakage activity sheets. Data will be fed into the company's "Leakage Reporting System" for analysis. Data will include details of boundary valve check and step test log.

Icosa Water aims to ensure that leaks on private pipes are repaired promptly. Leaks and bursts on private pipes are a major contributor to losses within the system.

The Water Research Council produces a document entitled "A Guide to Water Service Pipes" in which it defines the boundaries where the company's responsibilities end and the customer's responsibilities begin. The guidance document has been adopted as standard practice by Icosa Water.

Where a leak or burst is evident on private domestic mains or services, Icosa Water has published a set of service standards for dealing with leakage issues. In this respect Icosa Water, as the

asset manager, adopts the standards and policies applicable within the incumbent's operating region and published at that time.

New Property - Where a leak is detected or reported on private pipes the customer will be advised to contact the developer/builder under the guarantee and a waste notice served on the owner.

Existing Property - Where a leak is detected or reported on private pipes the occupier will be issued with a series of letters/waste notices informing them of their responsibility to effect repairs.

3.5 Target headroom

Headroom is a planning allowance that is used to provide a buffer in the forecast supply-demand balance. Target Headroom is defined as follows (UKWIR 1998):

> *"the minimum buffer that a prudent water company should allow between supply (including raw-water imports and excluding raw-water exports) and demand to cater for specified uncertainties (except those due to outages) in the overall supply-demand balance. Introducing this into the overall supply-demand balance will help to ensure that the water company's chosen level of service can be achieved."*

Available headroom is the difference between demand and WAFU (the water available for use) at any given time. It will vary with time as demand increases, new supplies are brought on-line to meet increasing demand and uncertainty increases the further into the future you go.

If Available Headroom is greater than or equal to Target Headroom, then the desired level of service should be achieved. If Available Headroom falls below the target value, the water company will face the risk of not achieving its stated level of service.

There are two accepted methods for calculating target headroom: the 1998 methodology (UKWIR 1998) and the 2003 methodology (UKWIR 2002). The latter presents an improved methodology which combines probability distributions of deployable output, demand, outage, and headroom to provide a probability-weighted balance of supply. This permits an assessment of the probability of supply failure at any given time to be obtained which can then be used to evaluate the success of any planned changes to the supply-demand balance. This method is particularly recommended where significant investment is required to develop new resources to close a supply-demand deficit.

In small resource zones where there is no immediate supply-demand balance issue, the simpler 1998 methodology is considered adequate. This method has therefore been used to estimate target headroom for the current WRMP. The method involves assigning a score to each source of uncertainty depending on the degree of uncertainty and the scale of its impact on the supply-demand balance. Only those uncertainties that lie outside the direct control of the water company are considered. A total of 11 factors are identified in the method as potential sources of uncertainty; 8 supply-related and 3 demand-related (see Table 3.2).

Table 3.2 The factors that determine Target Headroom (Source Table 3.1 (p.58) of UKWIR (2002))

Level	Supply Related	Score Range
S1	Vulnerable surface water licences	0 to 10
S2	Vulnerable groundwater licences	0 to 10
S3	Time limited licences	0 to 15
S4	Bulk transfers	0 to 5
S5	Gradual pollution of sources causing a reduction in abstraction	0 to 15
	Accuracy of supply-side data	
S6	Single source dominance and critical periods	0 to 5
S7	Uncertainty of impact of climate change on source yield	0 to 15
S8		0 to 10
	Demand Related	
D1	Accuracy of sub-component data	0 to 5
D2	Demand forecast variation	0 to 15
D3	Uncertainty of impact of climate change on demand	0 to 5

Each factor is evaluated separately for each resource zone with the scores for an individual zone aggregated. Some scores remain constant over time (e.g. the uncertainty attached to single site dominance) while others vary (e.g. the increasing uncertainly attached to the impact of climate change). This means there will be a minimum of 2 points in time at which uncertainty must be evaluated – the present day and the end of a planning horizon. Headroom scores are interpolated linearly between these 2 points. However, any change in WAFU (e.g. due to a new source or bulk supply connection coming online) creates a new planning horizon so there can potentially be several planning horizons at which headroom must be evaluated.

As all Icosa Water's future planning for supplies will be directly bulk transfers, the company has to plan for none of the supply related uncertainty associated with vulnerable or time-limited licences (S1, S2 and S3).

Supplies to Icosa Water (WAFU) are effectively fixed by the terms of the bulk supply agreements and so from Icosa Water's point of view climate change (S8) and the threat of gradual pollution (S5) have no direct impact on WAFU. Similarly, as the estimate of WAFU has not been based on supply-side data (e.g. records of river flow or groundwater levels), the accuracy of these data (S6) is not an issue. There could be indirect effects from climate change or gradual pollution if these factors influence the reliability of the bulk supplies from regional incumbents, but this uncertainty is accounted for under factor S4. Finally, bulk transfers are specifically excluded from any consideration of single source dominance and critical periods (S7). As a result, all supply-side headroom factors have been scored zero for all Icosa Water's inset areas except S4 – bulk transfers.

S4 considers the reliability of the transfers from AWS, AFW, SVT, SEW and SWS and the confidence that Icosa Water can have in the long-term sustainability of these sources of water. Because these transfers have operated for such a short period of time and have not yet reached their full capacity, their reliability cannot be assessed from historic data. Icosa Water has satisfied itself that AWS, AFW, SVT, SEW and SWS have properly planned to overcome any deficit in their own supply-demand balances over the planning period, and has confidence in the ability of AWS, AFW, SVT, SEW and SWS to maintain the bulk supplies to Icosa's sites. Nevertheless, there is always a risk of failure of a bulk supply and hence Icosa Water has assigned risk factors of three out of five for the start of the planning period and four out of five for the end of the planning period.

Demand related uncertainty, when considered across the entire Icosa Water portfolio, remains high due to the little metering information to indicate levels of customer consumption. As sites are further built out and more robust information will inform Icosa Water's thinking re the risk score. In the absence of such robust information, factor D1 has been scored as five out of five to reflect the nascency in the information available. This factor can be reduced in subsequent WRMP updates as metering information becomes available.

The overall uncertainty associated with Icosa Water's demand forecasts has been scored as four out of 15 for demand factor D2 again due to the lack of historic data.

Climate change is one of the biggest single risk factors for both AWS, SEW and SWS in their resource planning for the next 25 years. However, much of this risk is associated with the impact on the deployable output of sources. Periods of increasingly hot and/or dry weather will increase peak demand but the impact is thought to be relatively small and hence Icosa Water has scored

this uncertainty as nil out of five at the start of the planning period, and one out of five at the end of the planning period.

Overall, target headroom is calculated to rise slightly during the planning period from 6.5% to 7.7% of WAFU (see Table 3.3).

Table 3.3 Derivation of headroom scores for current inset areas

Level	Supply Related	Score Range	
		2021/2022	2045/2050
S1	Vulnerable surface water licences	0	0
S2	Vulnerable groundwater licences	0	0
S3	Time limited licences	0	0
S4	Bulk transfers	3	4
S5	Gradual pollution of sources causing a reduction in abstraction	0	0
S6	Accuracy of supply-side data	0	0
S7	Single source dominance and critical periods	0	0
S8	Uncertainty of impact of climate change on source yield	0	0
	Demand Related		
D1	Accuracy of sub-component data	5	5
D2	Demand forecast variation	0	4
D3	Uncertainty of impact of climate change on demand	0	1
	Total score	**8.0**	**10.5**
	Target Headroom (% of WAFU)	6.5	7.7

4 Details of the Water Resources Zones

4.1 Introduction

The methodology and assumptions used to construct the supply-demand balance are described in section 3. However, the balance itself will be different for each incumbent region as new inset areas come online and some of the values used to estimate demand also vary. The detailed supply-demand balance for each incumbent region is summarised in the remainder of this section 4 with details for the individual WRZ is discussed in Appendix B.

4.2 Affinity Water Limited (AFW)

4.2.1 Introduction
Icosa Water started supplying water to customers at Wilton Park on 23rd November 2021. The current baseline supply-demand forecast starts in 2022/23 and shows that Icosa Water has sufficient supplies (via the bulk supply from AFW) to meet forecast demands until the end of the planning period.

4.2.2 Water supply arrangements		
Number of Domestic Plots	99	
Number of Non Household Plots	0	

4.2.3 Current demands		
Current Demands / cubic meters/d	16.85	Site under construction. Limited meter information available so demand estimated - based on pcc of 130 l/h/d. Icosa recognises this is a conservative estimate of pcc and will look to revise when reliable data is available.

4.2.4 Demand forecasts and projections	
Currently developer has planning for 372 plots at Wilton Park	Additional WRZs will be included when they have passed through Ofwat's NAV process.

4.2.5 Deployable output and outage allowance

Maximum Transfer (Ml/yr)	12.61 l/s equivalent to 1089.6 Ml/d – 397.7 Ml/yr	Icosa Water has not made a separate allowance for outage, but has included the uncertainty associated with the bulk supply in the target headroom allowance.

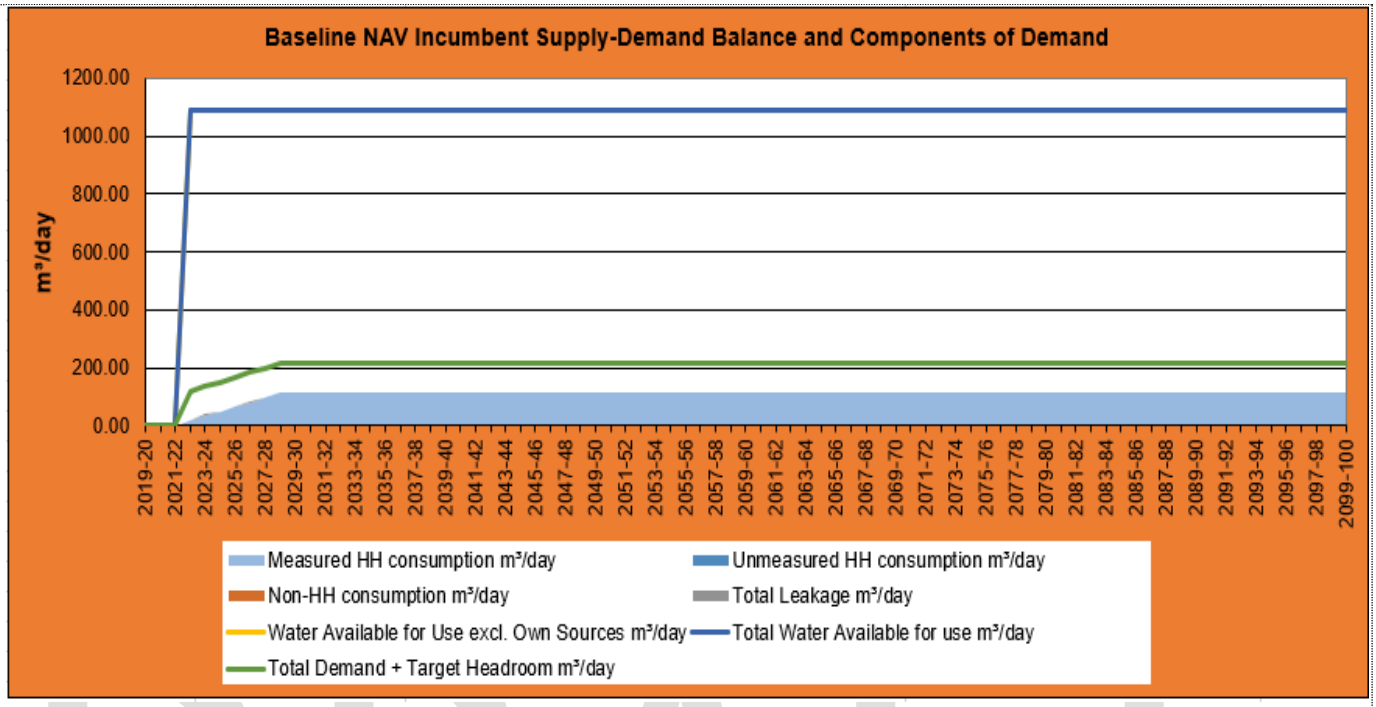
4.2.6 The baseline supply-demand balance

Maximum Annual Volume – 397.7 Ml/year

As development proceeds, Icosa Water will continue to monitor demand and update its forecast accordingly. If demand is higher than forecast, then Icosa Water will firstly consider demand management measures to resolve any potential imbalance, and secondly will consider the need to negotiate an additional supply from the incumbent.

Active leakage control will be built into business-as-usual processes so are not included in the final plan options. At present there are no non household units within AFW the region, so options have also been excluded. 'Change in volume delivered to measured households' will be assessed and included when construction has been completed and reliable meter data becomes available. Current data secured from meter reading activities in other incumbent regions where some developments are more advanced in terms of construction indicate pcc values of c.115 l/h/d being achieved.

Graph 1 - Base Line Water Supply-Demand Balance



4.2.7 Summary tables of assumptions

Table 4.2.1 Property numbers

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Total measured Non household	0	0	0	0	0	0	0	0	0
Total measured household	*54*	*99*	*165*	*165*	*215*	*265*	*315*	*372*	*372*
Total Properties	*54*	*99*	*165*	*165*	*215*	*265*	*315*	*372*	*372*

Table 4.2.2 Other assumptions

					Source
Occupancy rate for households		2.4	2.4	2.4	Icosa
Unaccounted for Water as a percentage of DI. Includes: leakage, USPL, water taken unbilled, distribution system operational use Input (total)	%	3%	3%	3%	Icosa

4.2.8 Final-planning supply-demand balance

As there is no deficit in baseline supply-demand balance, the only difference between the final plan and the baseline is the change of three currently unmeasured households to measured. This has no impact on the supply-demand balance.

4.2.9 Scenario testing
No scenario testing has been carried out for the WRZ in AFW region. Icosa Water will monitor consumption as the size of the portfolio increases. Consumption will be reviewed as part of the WRMP annual review and should additional supplies be required; will be negotiated with AFW.

4.3 Anglian Water Services Limited (AWS)

4.3.1 Introduction
Icosa Water supplies three inset areas in the Anglian Water region. The baseline supply-demand starts in 2021/2022 and the forecast shows that Icosa Water has sufficient supplies (via the bulk supply from AWS). The forecasts consider all existing household and non-household customers; they also include 92 new households currently within the planning process for the West Raynham WRZ. Depending on the scale of any additional development proposed an additional bulk supply and network upgrade maybe be required.

4.3.2 Water supply arrangements		
Number of Domestic Plots	379	
Number of Non Household Plots	25	

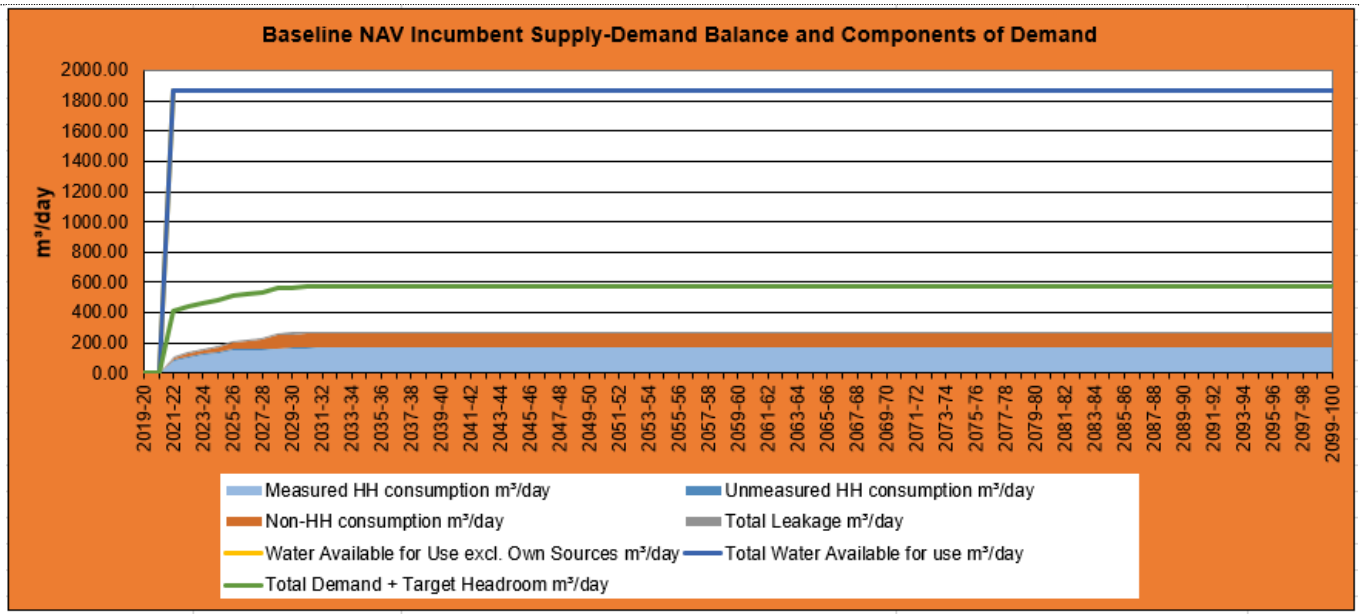
4.3.3 Current demands		
Current Demands / cubic meters/d	100.1	Two sites under construction. Limited meter information available. Demand estimate is based on pcc of 120 l/h/d. This is because current bulk supply data indicates usage levels of c. 120 l/h/d. Icosa will, if necessary, revise this when additional customer data becomes available.

4.3.4 Demand forecasts and projections

Based on the current order book more than 400 additional houses will be supplied by 2030	Additional WRZs will be included when they have passed through Ofwat's NAV process.

4.3.5 Deployable output and outage allowance		
Maximum Transfer (Ml/yr)	1867 m^3/d Equivalent to 681.46 Ml/year	Icosa Water has not made a separate allowance for outage, but has included the uncertainty associated with the bulk supply in the target headroom allowance.

4.3.6 The baseline supply-demand balance
Maximum Annual Volume – 681.46 Ml/year As development proceeds, Icosa Water will continue to monitor demand and update its forecast accordingly. If demand is higher than forecast, then Icosa Water will firstly consider demand management measures to resolve any potential imbalance, and secondly will consider the need to negotiate an additional supply from the incumbent. Active leakage control will be built into business-as-usual processes so are not included in the final plan options. Non household units and 'Change in volume delivered to measured households' will be assessed and included in the final plan options when construction has been completed and reliable meter data becomes available. Current data secured from meter reading activities in other incumbent regions where some developments are more advanced in terms of construction indicate pcc values of c.115 l/h/d being achieved.
Graph 4.3.1 - Base Line Water Supply-Demand Balance



4.3.7 Summary tables of assumptions

Table 4.3.1 Property numbers

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Total measured Non household	23	25	27	28	34	39	44	49	50
Total measured household	292	354	413	473	524	535	545	556	566
Total Properties	**315**	**379**	**440**	**501**	**558**	**574**	**589**	**605**	**616**

Table 4.3.2 Other assumptions

					Source
Occupancy rate for households		2.4	2.4	2.4	Icosa
Unaccounted for Water as a percentage of DI. Includes: leakage, USPL, water taken unbilled, distribution system operational use Input (total)	%	5%	5%	5%	Icosa

4.3.8 Final-planning supply-demand balance

As there is no deficit in baseline supply-demand balance, the only difference between the final plan and the baseline is the change of three currently unmeasured households to measured. This has no impact on the supply-demand balance.

4.3.9 Scenario testing
No scenario testing has been carried out for the WRZ in AWS region. Icosa Water will monitor consumption as the size of the portfolio increases. Consumption will be reviewed as part of the WRMP annual review and should additional supplies be required; will be negotiated with AWS.

4.4 Severn Trent Water Limited (SVT)

4.4.1 Introduction
Icosa Water supplies two inset areas in the Severn Trent Water region. The baseline supply-demand starts in 2021/2022 and the forecast shows that Icosa Water has sufficient supplies (via the bulk supply from SVT) to meet demands until the end of the planning period. The forecasts take all existing and planned new household and non-household customers into account.

4.4.2 Water supply arrangements		
Number of Domestic Plots	90	
Number of Non Household Plots	0	

4.4.3 Current demands		
Current Demands / cubic meters/d	28.1	Both sites under construction. Limited meter information available. Demand estimated - based on pcc of 130 l/h/d. Icosa recognises this is a conservative estimate of pcc and will look to revise when reliable data is available.

4.4.4 Demand forecasts and projections	
Based on the current order book more than 1500 additional houses will be supplied by 2040	Additional WRZs will be included when they have passed through Ofwat's NAV process.

4.4.5 Deployable output and outage allowance		
Maximum Transfer (Ml/yr)	1960.2 m^3/d Equivalent to 715.47 Ml/year	Icosa Water has not made a separate allowance for outage but has included the uncertainty associated with the bulk supply in the target headroom allowance.

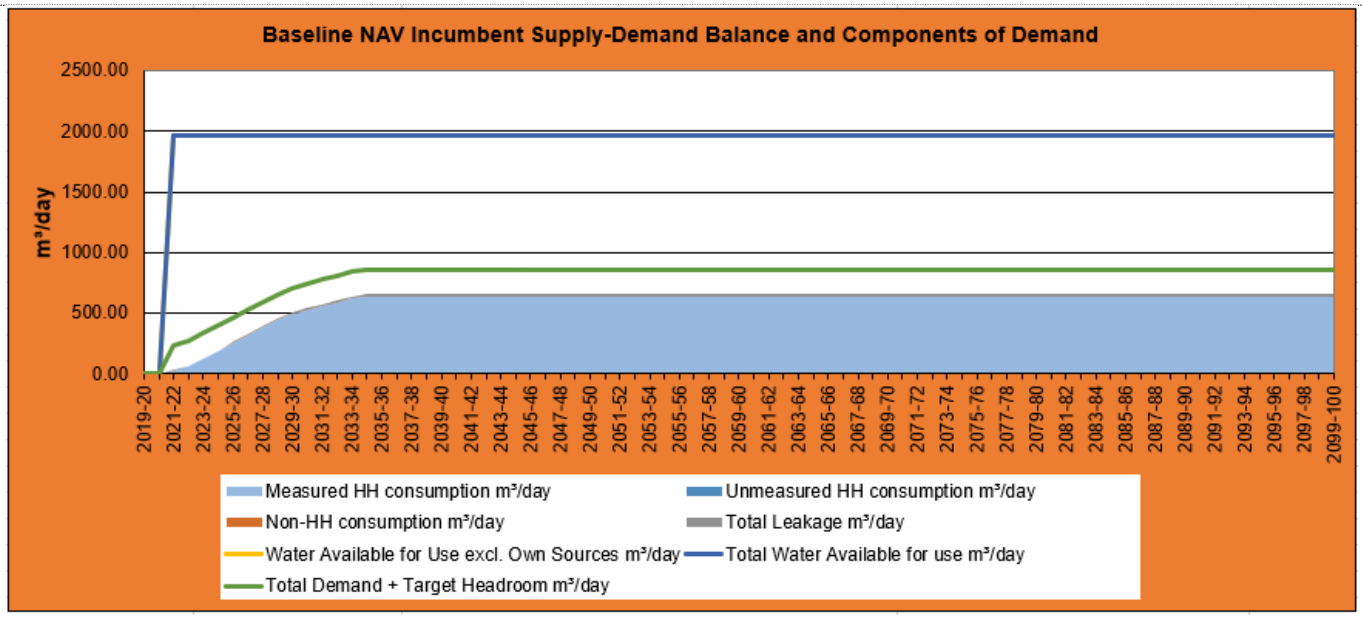
4.4.6 The baseline supply-demand balance

Maximum Annual Volume – 715.47 Ml/year

As development proceeds, Icosa Water will continue to monitor demand and update its forecast accordingly. If demand is higher than forecast, then Icosa Water will firstly consider demand management measures to resolve any potential imbalance, and secondly will consider the need to negotiate an additional supply from the incumbent.

Active leakage control will be built into business-as-usual processes so are not included in the final plan options. At present there are no non household units within SVT the region, so options have also been excluded. 'Change in volume delivered to measured households' will be assessed and included when construction has been completed and reliable meter data becomes available. Current data secured from meter reading activities in other incumbent regions where some developments are more advanced in terms of construction indicate pcc values of c.115 l/h/d being achieved.

Graph 4.4.1 - Base Line Water Supply-Demand Balance



4.4.7 Summary tables of assumptions

Table 4.4.1 Property numbers

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Total measured Non household	0	0	0	0	0	0	0	0	0
Total measured household	90	206	406	606	806	1016	1216	1406	1578
Total Properties	90	206	406	606	806	1016	1216	1406	1578

Table 4.3.2 Other assumptions

		Before 2025/26	Between 2025/26 to 2030/31	After 2030/31	Source
Occupancy rate for households		2.4	2.4	2.4	Icosa
Unaccounted for Water as a percentage of DI. Includes: leakage, USPL, water taken unbilled, distribution system operational use Input (total)	%	2.5%	3.5%	4% increasing to 5% by 2043/44	Icosa

4.4.8 Final-planning supply-demand balance

As there is no deficit in baseline supply-demand balance, the only difference between the final plan and the baseline is the change of three currently unmeasured households to measured. This has no impact on the supply-demand balance.

4.4.9 Scenario testing

No scenario testing has been carried out for the WRZ in SVT region. Icosa Water will monitor consumption as the size of the portfolio increases. Consumption will be reviewed as part of the WRMP annual review and should additional supplies be required; will be negotiated with AWS.

4.5 South East Water Limited (SEW)

4.5.1 Introduction
Icosa Water supplies six inset areas in the South East Water region. The baseline supply-demand starts in 2021/2022 and the forecast shows that Icosa Water has sufficient supplies (via the bulk supply from SEW) to meet demands until the end of the planning period. The forecasts take all existing and planned new household and non-household customers into account.

4.5.2 Water supply arrangements		
Number of Domestic Plots	1032	
Number of Non Household Plots	6	

4.5.3 Current demands		
Current Demands / cubic meters/d	242	All sites still under construction. Quality of meter information available is fairly good and allows a pcc of 115 l/h/d to be estimated - Icosa will be able to revise once construction activities has stopped.

4.5.4 Demand forecasts and projections	
Based on the current order book more than 1500 houses will be supplied by 2030	Additional WRZs will be included when they have passed through Ofwat's NAV process.

4.5.5 Deployable output and outage allowance		
Maximum Transfer (Ml/yr)	1755.76 m^3/d Equivalent to 640.85 Ml/year	Icosa Water has not made a separate allowance for outage but has included the uncertainty associated with the bulk supply in the target headroom allowance.

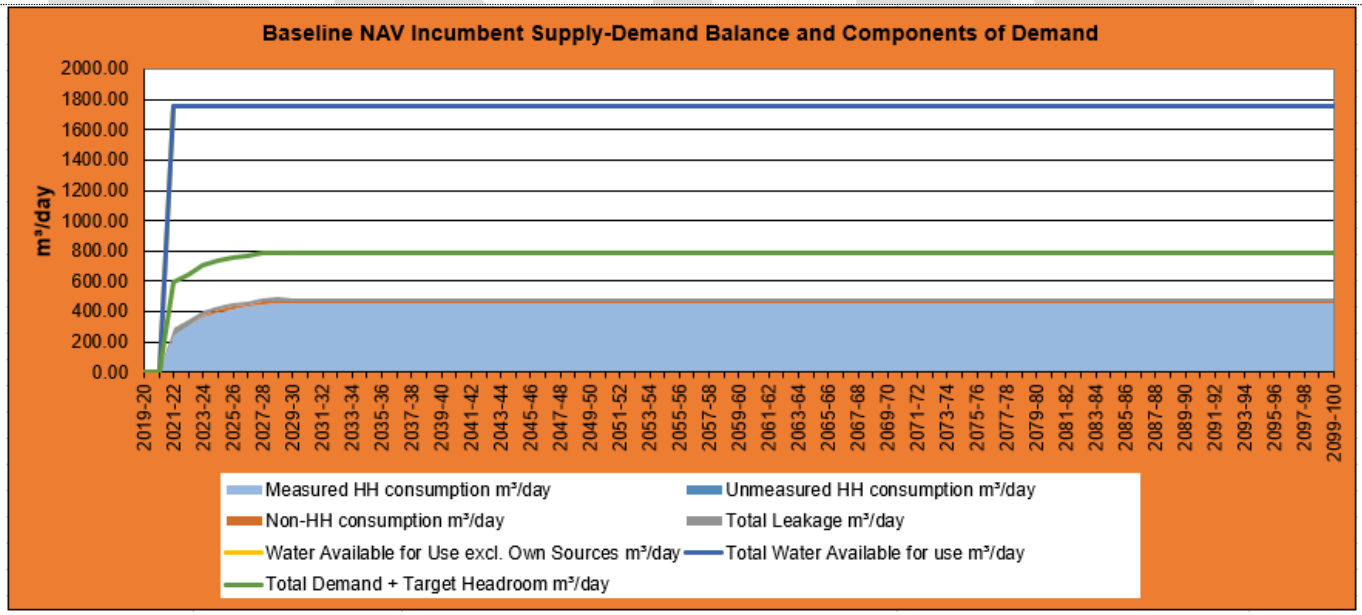
4.5.6 The baseline supply-demand balance

Maximum Annual Volume – 640.85 Ml/year

As development proceeds, Icosa Water will continue to monitor demand and update its forecast accordingly. If demand is higher than forecast, then Icosa Water will firstly consider demand management measures to resolve any potential imbalance, and secondly will consider the need to negotiate an additional supply from the incumbent.

Active leakage control will be built into business-as-usual processes so are not included in the final plan options. Non household units and 'Change in volume delivered to measured households' will be assessed and included in the final plan options when construction has been completed and reliable meter data becomes available.

Graph 4.5.1 - Base Line Water Supply-Demand Balance



4.5.7 Summary tables of assumptions

Table 4.5.1 Property numbers

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Total measured Non household	6	6	6	6	6	6	6	6	6

Total measured household	1032	1173	1398	1472	1521	1574	1626	1646	1646
Total Properties	**1038**	**1179**	**1404**	**1478**	**1527**	**1580**	**1632**	**1652**	**1652**

Table 4.5.2 Other assumptions

		Before 2025/26	After 2025/26	Source
Occupancy rate for households		2.4	2.4	Icosa
Unaccounted for Water as a percentage of DI. Includes: leakage, USPL, water taken unbilled, distribution system operational use Input (total)	%	7 to 5%	5%	Icosa

4.5.8 Final-planning supply-demand balance

As there is no deficit in baseline supply-demand balance, the only difference between the final plan and the baseline is the change of three currently unmeasured households to measured. This has no impact on the supply-demand balance.

4.5.9 Scenario testing

No scenario testing has been carried out for the WRZ in SEW region. Icosa Water will monitor consumption as the size of the portfolio increases. Consumption will be reviewed as part of the WRMP annual review and should additional supplies be required; will be negotiated with SEW.

4.6 Southern Water Services Limited (SWS)

4.6.1 Introduction

Icosa Water supplies three inset areas in the Southern Water region. The baseline supply-demand forecast starts in 2021/22 and shows that Icosa Water has sufficient supplies (via the bulk supply from SWS) to meet demands until the end of the planning period. The forecasts take all existing household and non-household customers into account. Icosa Water is currently negotiating additional bulk connections to allow it to provide water to circa 470 additional plots planned for Westridge Village. Icosa Water had previously identified a potential deficit in available supply to Rochester Riverside WRZ. This deficit has now been resolved by securing additional supply commitments from SWS.

4.6.2 Current water supply arrangements		
Number of Domestic Plots	358	
Number of Non Household Plots	3	

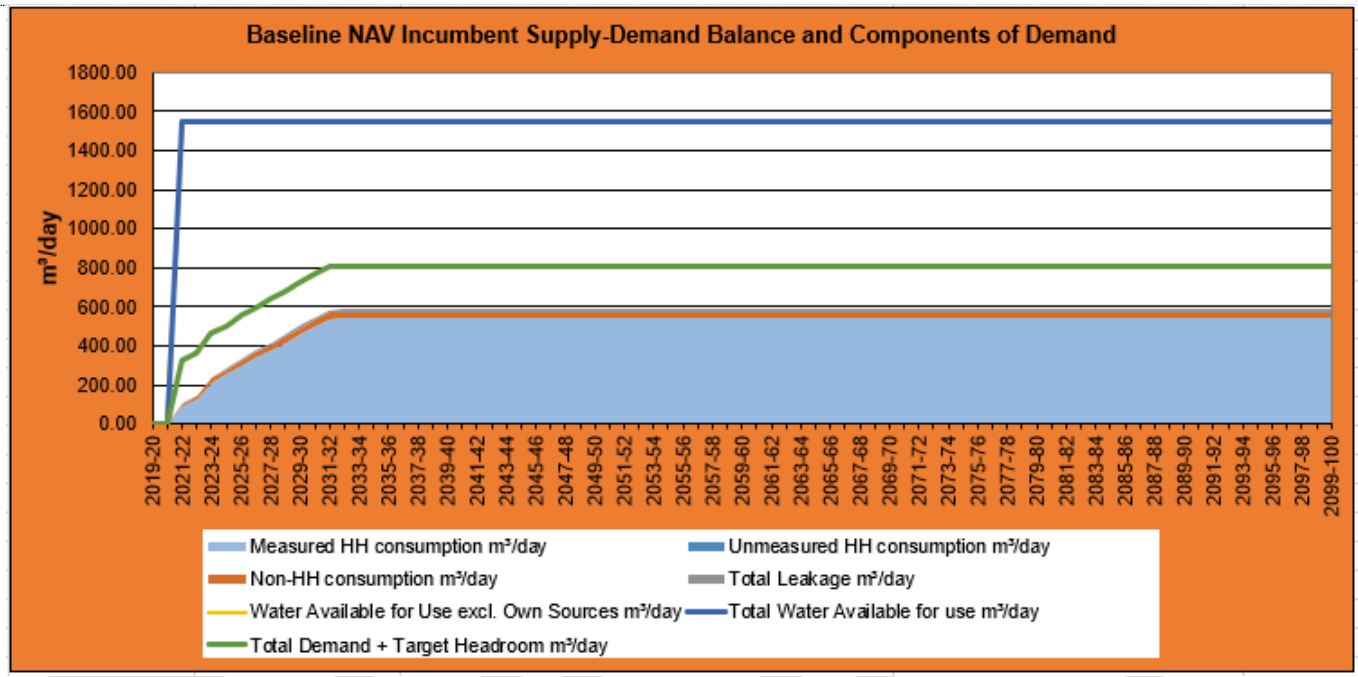
4.6.3 Current demands		
Current Demands / cubic meters/d	103.9	All sites still under construction. Quality of meter information available is fairly good and allows a pcc of 115 l/h/d to be estimated - Icosa will be able to revise once construction activities has stopped.

4.6.4 Demand forecasts and projections	
Based on the current order book more than 2000 houses will be supplied by end of 2030	Additional WRZs will be included when they have passed through Ofwat's NAV process.

4.6.5 Deployable output and outage allowance		
Maximum Transfer (Ml/yr)	1548.56 m^3/d Equivalent to 565.2 Ml/year	Icosa Water has not made a separate allowance for outage but has included the uncertainty associated with the bulk supply in the target headroom allowance.

4.6.6 The baseline supply-demand balance
Maximum Annual Volume – 565.2 Ml/year As development proceeds, Icosa Water will continue to monitor demand and update its forecast accordingly. If demand is higher than forecast, then Icosa Water will firstly consider demand management measures to resolve any potential imbalance, and secondly will consider the need to negotiate an additional supply from the incumbent. Active leakage control will be built into business-as-usual processes so are not included in the final plan options. Non household units and 'Change in volume delivered to measured households' will be assessed and included in the final plan options when construction has been completed and reliable meter data becomes available.

Graph 4.6.1 - Base Line Water Supply-Demand Balance



4.6.7 Summary tables of assumptions

Table 4.6.1 Property numbers

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Total measured Non household	3	4	5	5	6	6	6	6	6
Total measured household	358	467	766	917	1067	1217	1367	1517	1667
Total Properties	**361**	**471**	**771**	**922**	**1073**	**1223**	**1373**	**1523**	**1673**

Table 4.5.2 Other assumptions

		Before 2025/26	After 2025/26	Source
Occupancy rate for households		2.4	2.4	Icosa
Unaccounted for Water as a percentage of DI. Includes: leakage, USPL, water taken unbilled, distribution system operational use Input (total)	%	2 to 5%	3 to 4.5%	Icosa

4.6.8 Final-planning supply-demand balance

As there is no deficit in baseline supply-demand balance, the only difference between the final plan and the baseline is the change of three currently unmeasured households to measured. This has no impact on the supply-demand balance.

4.6.9 Scenario testing

No scenario testing has been carried out for the WRZ in SEW region. Icosa Water will monitor consumption as the size of the portfolio increases. Consumption will be reviewed as part of the WRMP annual review and should additional supplies be required; will be negotiated with SEW.

5 Environmental regulatory requirements

Icosa Water will work closely with the incumbent water companies as required in assessing the potential impact of licenced abstraction in designated or environmentally sensitive areas under the terms of:

- The Water Framework Directive
- The Wildlife and Countryside Act (including consideration of invasive non-native species)
- The Countryside and Rights of Way Act 2000
- Conservation of Habitats and Species Regulations 2017
- Eels (England and Wales) Regulations 2009
- Wildlife and Countryside Act 1981
- The Environment Agency's Restoring Sustainable Abstractions (RSA) programme, local Environment programme sustainability investigations
- Abstraction reform
- Biodiversity action plans
- Catchments Abstraction Management Strategies (CAMS).

However, given that Icosa Water will not be operating any of its own sources at this stage, it is not considered to be a major issue that needs to be addressed within this plan.

6 Strategic Environmental Assessment (SEA)

The SEA process enables all options considered by Icosa Water during the formulation of the preferred strategy, to be appraised against Icosa Water's own environmental objectives. This process thereby allows Icosa Water to demonstrate how it has considered the most environmentally favourable solutions within its overall strategy.

However, while the Company will work closely with the incumbent water company as appropriate, given that it will not be operating any abstraction sources it is not considered necessary to address this topic specifically within the WRMP.

7 Resilience

Defra, the Environment Agency, the Drinking Water Inspectorate and Ofwat have advised water companies that customers' water needs must be met in a safe, resilient and efficient way, while protecting the environment and respecting good supply practice and the needs of other water users. This is becoming ever more challenging as water resources face increasing pressures from climate change, population growth, societal expectations and increasing environmental aspirations.

The Ofwat Resilience Task and Finish Working Group define "resilience" as follows:

> *"Resilience is the ability to cope with, and recover from, disruption, and anticipate trends and variability in order to maintain services for people and protect the natural environment now and in the future."*

The primary drivers for resilience planning are set out in UKWIR's "Resilience Planning: Good Practice Guide" (Report Ref No. 13/RG/06/02). They are:

- Drought
- Flooding
- Extreme, prolonged cold spells
- Climate change

The Guide also sets out a list of hazards, both weather and non-weather related. Icosa Water has carefully considered these drivers and hazards and is satisfied that its plan has sufficient and appropriate levels of resilience in order to maintain services for people while protecting the natural environment now and in the future.

Appendix A lists these hazards and Icosa Water's response to them. In summary:

- General. Most of the hazards listed are more likely to affect the incumbent water company's ability to deliver a bulk supply to Icosa Water's sites. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water Services') and is satisfied that these companies have properly considered resilience and have resilient plans in place.
- Drought. Please refer to Icosa Water's Drought Plan.
- Flooding. Icosa Water has studied the Environment Agency's flood risk maps for its WRZs and is satisfied that flooding does not pose a significant risk.

- Extreme, prolonged cold spells. The reticulation networks in the WRZs are newly laid in MDPE. The mains have been laid in accordance with NJUG guidelines to ensure protection against prolonged cold spells.
- Icosa Water's website provides advice to customers on guarding against the harsh effects of winter – the aim being to try and reduce leaks on customers' properties resulting from the effects of freeze/thaw. The site also provides advice on circumstances in which Icosa Water may be required to impose temporary use bans (TUBS).
- Further, Icosa Water has put in place measures for dealing promptly with leaks identified in its network.
- Climate change. Climate change has the potential to affect source yields and customer usage over time.
- The availability of water is covered by the bulk supply agreements with the incumbent suppliers.
- Icosa Water will work with its customers to encourage the efficient use of water. In addition, the target headroom allowance includes a small allowance for the uncertainty associated with climate change.
- Other hazards – see Appendix A.

8 Board assurance and governance

8.1 Process

Icosa Water has worked in consultation with the Environment Agency and Ofwat during the initial development of the WRMP.

8.2 Board and director involvement

The Board of Icosa Water is being kept appraised of development of the WRMP with active directors involved in the day-to-day operation of the regulated business contributing to the preparation of the plan and have agreed to it being submitted. Further consultation and final board approval will be secured prior to publication and following any feedback during the consultation process.

9 References

AWS, “Water Resources Management Plan” Anglian Water, 2019.

SEW, “Water Resources Management Plan”. South East Water 2019

SWS, “Water Resource Management Plan”, Southern Water 2019.

Defra (2008), “Future Water – The Governments’ water strategy for England,” February 2008.

EA, “Water resources planning guideline,” Environment Agency, published 4 April 2022 (as updated on 22 July 2022).

Water Framework Directive

Drinking Water Directive

Water Resources Act 1991

Environment Act 1995

UKWIR (1995a), “Outage allowances for water resource planning,” Report Ref. No. 95/WRP/0001/B, Sir William Halcrow & Partners for UK Water Industry Research Limited, 1995.

UKWIR (1995b), “Outage allowances for water resource planning – user guide,” Report Ref. No. 95/WR/01/3, Sir William Halcrow & Partners for UK Water Industry Research Limited, 1995.

UKWIR/EA (1998), “A practical method for converting uncertainty into headroom,” Report Ref. No. 98/WR/13/1, Sir William Halcrow & Partners for UK Water Industry Research Limited and Environment Agency, 1998.

UKWIR (2002), “An improved methodology for assessing headroom”,
Report Ref. No. 02/WR/13/2, Mott MacDonald for UK Water Industry
Research Limited, 2002

UKWIR 2013 “Resilience Planning: Good Practice Guide” (Report Ref No. 13/RG/06/02).

UKWIR 2017 “Resilience Performance Measures, Costs and Stakeholder Communication” (Report Ref No. 17/RG/06/4

10 Glossary of terms and abbreviations

Abbreviation	Term	Description
AFW	Affinity Water Limited	Name and title Incumbent water company - 'Affinity Water'
AMP6	Asset Management Plan	5 year planning period and infrastructure investment programme period 2019 - 2024
AMR	Automated Meter Reading	The technology of automatically collecting consumption and diagnostic data from water or energy meters and transferring it to a central database for billing, troubleshooting and analysis
AWS	Anglian Water Services Ltd	Name and title Incumbent water company - 'Anglian Water'
CAMS	Catchment Abstraction Management Strategy	Strategies to help safeguard water resources despite the increasing pressure on water availability from climate change and population growth; involves assessments of how much water is reliably available on a catchment by catchment basis
CFSH	The Code for Sustainable Homes	The national standard for the sustainable design and construction of new homes
CLG	Dept. for Communities & Local Government	Responsible for local government, regeneration, neighbourhoods, planning housing and the built environment.
Defra	Dept. for Environment Food and Rural Affairs	The UK government department responsible for policy and regulations on the environment, food and rural affairs
	Headroom	A planning allowance that is used to provide a buffer in the forecast supply-demand balance
	Available headroom	The difference between demand and WAFU at any given time
	Target headroom	The minimum buffer that a prudent water company should allow between supply and demand to cater for specified uncertainties
	Inset appointment	the appointment by Ofwat of an independent limited company to replace the incumbent as the appointed water and/or sewerage company for a specified area
	Icosa Water	Inset appointed water company
LOS	Levels of Service	The standard of service (effectively the reliability of supply) that a customer can expect to receive and the average frequency with which restrictions on water use are likely to be applied
l/h/d	Litres per head per day	A unit used to quantify per capita consumption of water usually domestic consumption.
l/prop/d	Litres per property per day	A unit of demand or consumption which is often used to describe rates of leakage from the distribution network
l/s	Litres per second	A rate of flow

NEP	National Environment Programme	A list of environmental improvement schemes drawn up by EA, in consultation with others, to ensure that water companies help to meet European and national water-related targets
Ofwat	The Water Services Regulation Authority	The economic regulator of the water and sewerage sectors in England and Wales
pcc	Per capita consumption	The rate of water consumption expressed as an average per head of population
poc	Point of connection	The point at which the bulk supply from the donor company's network enters the Icosa Water distribution network
RSA	Restoring Sustainable Abstractions	An Environment Agency programme to assess all licences that permit abstractions from rivers or groundwater against the level of environmental impact they cause or potentially could cause to ensure they can be sustained without damaging the environment
SEA	Strategic Environmental Assessment	An assessment, called for under the European SEA Directive, to identify and consider the significant environmental issues likely to arise from the content of strategic documents such as plans, programmes and strategies including WRMPs
SEW	South East Water	Name and title Incumbent water company - 'South East Water'
SWS	Southern Water Services	Name and title Incumbent water company – 'Southern Water Services'
SVT	Severn Trent Water	Name and title Incumbent water company - 'Severn Trent Water'
UKWIR	UK Water Industry Research	An organisation set up by the UK water industry in 1993 to facilitate collaborative research for UK water operators.
USPL	Underground Supply Pipe Leakage	Leakage occurring from the supply pipe that connects a customer's property to the water company's main.
WAFU	Water Available for Use	The amount of water available to meet expected demand. It is calculated by deducting allowable outages and planning allowances (such as sustainability reductions) from deployable output
WRMP	Water Resources Management Plan	A statement of how a water company intends to maintain the balance between the supply and demand for water over a 25-year period, together with economic, social and environmental justification for its preferred set of options for meeting projected demand
WRPG	Water Resources Planning Guidelines	Regularly updated documents issued by the Environment Agency in collaboration with Defra, Ofwat and the Welsh Government to guide water companies in the development and presentation of their WRMPs
WRZ	Water Resource Zone	A discrete area in which resources can be shared so that all customers experience the same risk of supply failure from a resource shortfall

Appendix A – Resilience – other hazards

Further to Section 7, and with reference to the UKWIR report "Resilience Planning: Good Practice Guide" Report Ref. No. 13/RG/06/02, Icosa Water has considered the risks and hazards that could challenge the requirement for customers' water needs to be met in a safe, resilient and efficient way, while protecting the environment and respecting good supply practice and the needs of other water users.

A brief summary of these follows:

Weather and climate related

- Coastal flooding: no impact
- Drought/Prolonged hot/dry weather: accounted for in the demand forecast and levels of service
- Excessive cold and ice/snow:
  - mains laid at depth to avoid freezing
  - customers given advice on protection against freeze/thaw
  - Icosa Water prepared for quick response to identified leakage
- Fluvial flooding: Icosa Water has studied the Environment Agency's flood risk maps for its WRZs and is satisfied that flood does not pose a significant risk. Both WRZs are outside of Flood Zone 3.
- Ground water flooding: as for fluvial flooding.
- Landslip/subsidence: there has been no evidence of landslip or subsidence on either site.
- Sea level rise: both sites are above any foreseeable rise sea level
- Lightning strike: loss of power could be a risk to bulk supplies. Generally, the incumbent water companies will have standby power available
- Storms and gales:
  - loss of power could be a risk to bulk supplies. Generally, the incumbent water companies will have standby power available;
  - access problems for mains repairs could present short term problems.

Procurement and staffing

- Potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.

Pollution incidents

- Low risk to Icosa Water's WRZs.
- Potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.

Physical damage

- Potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's

and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.

Societal

- Third party interventions (e.g. misconnections, metal theft, emptying inappropriate material into manholes). Low risk on WRZs themselves. Icosa Water monitor water delivered via the bulk supply. Significant changes that could be as a consequence of third party interventions (e.g. illegal use of water) are investigated.
- Other societal hazards: potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.

Communications and power

- General - potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.
- Cyber attack – Icosa Water take the risk of cyber security seriously, and have the necessary systems and back-up in place to minimise the risk of cyber attack.

Geological processes

- Generally not a risk to Icosa Water's WRZs. Potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.

Miscellaneous

- Generally only a low risk to Icosa Water's WRZs. Potentially a risk to the bulk supplies. Icosa Water has reviewed the incumbent water companies WRMPs (Anglian Water's, Affinity Water's, Severn Trent's, South East Water's and Southern Water's) and is satisfied that these companies have properly considered resilience and have resilient plans.

Appendix B – Site Specific Details

For the purposes of this report, each Icosa Water inset area is treated as a separate WRZ. This section will be updated as new inset areas are licensed. Updates will be included in the annual review of the WRMP.

For the avoidance of doubt, all per capita consumption figures mentioned in the tables below are based on bulk supply metering data (where available) and not on customer meter reads. As sites become more mature and Icosa Water rolls out its smart metering technology Icosa Water expects customer read data to form part of the assessment. Bulk supply data will include water used for construction purposes. Therefore, Icosa Water anticipates that the per capita consumption figures are likely to reduce as construction activities taper off on sites.

17-001	**West Raynham**
Bulk Supply provider	Anglian Water
Incumbent WRZ	Fenland
Year License Granted	2017
Year of First WRMP	2019

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
No Icosa Water has been informed that a potential planning application for 92 additional properties may be submitted in the next 12 months.	263	20

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,120 l/h/d	There are circa 25 unmetered properties. Some customer supply pipes are in poor condition and prone to leaking.
Unaccounted for Water	Currently set at 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
197	68.4	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period. The target headroom may be reviewed during the planning period.

17-002	**Rosewood Park**
Bulk Supply provider	South East Water
Incumbent WRZ	Eastbourne
Year License Granted	2018
Year of First WRMP	2019

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes.	341	5

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,115 l/h/d	When construction activity stops pcc and unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
189	96.36	50

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

17-004	**Rochester Riverside**
Bulk Supply provider	Southern Water
Incumbent WRZ	Kent Medway East
Year License Granted	2018
Year of First WRMP	2019

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	1400	6

Supply Assumptions

Per Capita Consumption (pcc)	Currently, 115 l/h/d	When construction activity stops pcc and unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at circa 3% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
865	405.36	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

17-005	**Conningbrook**
Bulk Supply provider	South East Water
Incumbent WRZ	Ashford
Year License Granted	2018
Year of First WRMP	2019

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	500	1

Supply Assumptions		
Per Capita Consumption (pcc)	Currently estimated at circa 138 l/h/d.	Despite two leakage investigations already carried out by two independent companies, nightline levels are still elevated. Ongoing investigation to discover reasons for high levels of unaccounted for water, including further leakage surveys. When construction activity stops pcc and unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently there are higher levels of unaccounted for water on this network than Icosa Water would expect when compared to all other sites. For 2025/26 target set at circa 10% of distribution input reducing to 5% of distribution input from 2026/27	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
540	150.58	50

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

17-007	**Thetford**
Bulk Supply provider	Anglian Water
Incumbent WRZ	Suffolk Thetford
Year License Granted	2019
Year of First WRMP	2019

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	343	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,120 l/h/d	When construction activity stops pcc and unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at circa 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
290	97.34	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

17-013	**Broadland Gate**
Bulk Supply provider	Anglian Water
Incumbent WRZ	Suffolk Thetford
Year License Granted	2019
Year of First WRMP	2019

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	0	39

Supply Assumptions		
Per Unit Consumption	Currently estimated as1500 litres per day	When construction activity stops unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at circa 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
1380	74	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

17-018	**Forstal lane Coxheath**
Bulk Supply provider	South East Water
Incumbent WRZ	Maidstone
Year License Granted	2019
Year of First WRMP	2020

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	210	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,115 l/h/d	When construction activity stops unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at circa 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
345	56.3	50

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

18-004	**Marden Road Staplehurst**
Bulk Supply provider	South East Water
Incumbent WRZ	Cranbrook
Year License Granted	2019
Year of First WRMP	2020

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	250	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently, 120 l/h/d	When construction activity stops unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at circa 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
345	67.07	50

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

18-015	**Ospringe**
Bulk Supply provider	South East Water
Incumbent WRZ	Ashford
Year License Granted	2021
Year of First WRMP	2022

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	123	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,120 l/h/d	When construction activity stops unaccounted for water rates will be reviewed.
Unaccounted for Water	Currently set at circa 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
259	34.56	50

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

18-022	**Ulcombe Road Headcorn**
Bulk Supply provider	South East Water
Incumbent WRZ	Cranbrook
Year License Granted	2019
Year of First WRMP	2020

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	220	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,117 l/h/d	When construction activity stops unaccounted for water rates reviewed.
Unaccounted for Water	Over planning period set between 4.5% and 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
259	34.56	50

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

18-025	**Toddington Lane Littlehampton**
Bulk Supply provider	Southern Water
Incumbent WRZ	Sussex Worthing
Year License Granted	2020
Year of First WRMP	2022

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	910	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,115 l/h/d	When construction activity stops unaccounted for water rates will be reviewed.
Unaccounted for Water	Over planning period set between 2% and 3% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m^3/day
605.8	147.11	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

19-005	**Westridge Village**
Bulk Supply provider	Southern Water
Incumbent WRZ	Isle of Wight
Year License Granted	2020
Year of First WRMP	2022

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	80	0

Note: Icosa Water currently negotiating for additional supplies for circa 470 plots with Southern Water

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,115 l/h/d	

Unaccounted for Water	Over planning period set at 3% of distribution input.	When construction activity stops unaccounted for water rates reviewed.

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m^3/day
77.76	21.53	20

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

19-026	**Wilton Park**
Bulk Supply provider	Affinity Water
Incumbent WRZ	Misbourne
Year License Granted	2022
Year of First WRMP	2022

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	500	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently, 130 l/h/d	When sufficient meter information becomes available pcc and unaccounted for water rates will be reviewed
Unaccounted for Water	Initially set at 3% of projected distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m3/day
1090	112.63	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The target headroom will be reviewed when sufficient meter information becomes available.

19-038	**Innsworth**
Bulk Supply provider	Severn Trent Water
Incumbent WRZ	SvT Strategic Grid
Year License Granted	2020
Year of First WRMP	2022

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	1300	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently,130 l/h/d	When construction activity stops unaccounted for water rates reviewed.
Unaccounted for Water	Over planning period set at 2.5% to 5% of distribution input.	

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m^3/day
1072.5	405.6	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.

19-038	**Twigworth**
Bulk Supply provider	Severn Trent Water
Incumbent WRZ	SvT Strategic Grid
Year License Granted	2021
Year of First WRMP	2022

Construction Activity? Yes/No	Ultimate Number of Domestic Households	Ultimate Number of Non Domestic Households
Yes	725	0

Supply Assumptions		
Per Capita Consumption (pcc)	Currently, 130 l/h/d	

Unaccounted for Water	Over planning period set at 2.5% to 5% of distribution input.	When construction activity stops unaccounted for water rates reviewed.

WAFU / m^3/day	Projected Demand at Full Build out / m^3/day	Target Headroom / m^3/day
887.7	225.58	100

Final-planning supply-demand balance

Current modelling indicates there is no deficit in baseline supply-demand balance over the planning period, The pcc, unaccounted for water rates and target headroom will be reviewed when construction activity stops.