From: David Monteith [redacted]
Sent: 10 September 2021 17:53
To: SizewellC <sizewellc@planninginspectorate.gov.uk>
Cc: [redacted]
Subject: Essex and Suffolk Water - The Sizewell C Project

Dear Sir/Madam,

Our Ref: SIZE-AFP059

We write on behalf of our client NWL. In our letter of 3 September, we indicated that NWL was working to provide a background technical paper as soon as possible so that the ExA has additional information on water supply issues.

The applicant yesterday made some proposals to NWL in relation to water supply which NWL is now considering carefully. We are providing the technical paper to explain the position set out in NWL's letter of 3 September more fully and to provide the ExA with the information promised as soon as possible, however, the paper has not been revised to incorporate the proposals circulated by the applicant yesterday, which are still under review.

We would be grateful if you could please acknowledge safe receipt of this email and attachment.

Kind regards,

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Contents

1 Purpose of this Document

This paper provides water resources planning technical detail and supports NWL's letter to the ExA regarding a mains water supply to the proposed Sizewell C Power Station (dated 03 September 2021).

2 Proposed Sizewell C Power Station

Sizewell C Co has asked NWL to provide a peak 4Ml/d mains water supply to the Sizewell C site during construction and up to 2.8Ml/d of mains water once the power station is operational.

3 Water Resources Planning Process

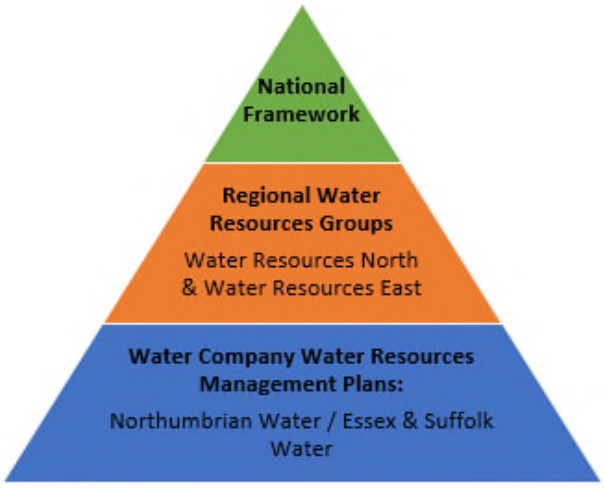
3.1 Overview

Every five years, water companies are required to develop a Water Resources Management Plan (WRMP) which sets out how they will provide a resilient and

sustainable supply of water to their customers over a minimum 25 year planning period.

There are three tiers of water resources planning in England as illustrated in Figure 1 below.

Figure 1: PR24 Water Resources Planning Framework



Each of the above tiers are described below.

3.2 National Framework for Water Resources

The National Framework sets out the long-term needs of all sectors in England that depend on a secure supply of water. This includes public water supplies to homes and businesses, direct abstraction for agriculture, electricity generation and the water needs of the environment. The National Framework:

- identifies that with climate change and growth in customer demand, there will be a national water supply deficit; and
- sets out the EA's expectations for regional water resources planning groups with respect to solving regional supply deficits and increasing abstraction sustainability.

3.3 Regional Water Resources Groups

3.3.1 Overview

England has been divided into five regional groups with Essex & Suffolk Water being a core member of Water Resources East (WRE) - www.waterresourceseast.org.

The regional groups are expected to deliver:

- a resource assessment informing the needs of the region;
- a list of options considered to resolve deficits within the region and contribute to the national need; and

- a preferred water resources management plan with an agreed level of environmental ambition that identifies the best value strategic options to meet multi-sector water demands.

The National Framework sets out the actions that 'must' and 'should' be incorporated into the regional plans. Elements that are a 'must' will be expected in the plans, and if not included, the plan is unlikely to be fit for purpose. These elements include:

- reflection in water company Water Resources Management Plans 2024 (WRMP24s) (see Section 4.1 below). It is expected that the public water supply options identified in the regional plans will be reflected in, and implemented through, individual WRMP24s;
- forecast supply and demand over at least 25 years; and
- multi-sector approach – the supply demand balance of a region must include the needs of sectors such as business, industry, navigation, electricity generation and agriculture.

Actions that are a 'should' are strongly encouraged to be included in regional plans, and include:

- wide engagement with interested groups, for example environmental NGOs, environmental charities and catchment groups;
- common scenarios for drought actions – the regional plan should ensure that the individual water company drought plans can work together effectively at a regional level; and
- look ahead 50 years or more.

The regional water resources groups and water companies will submit their draft WRMPs to Defra in August 2022.

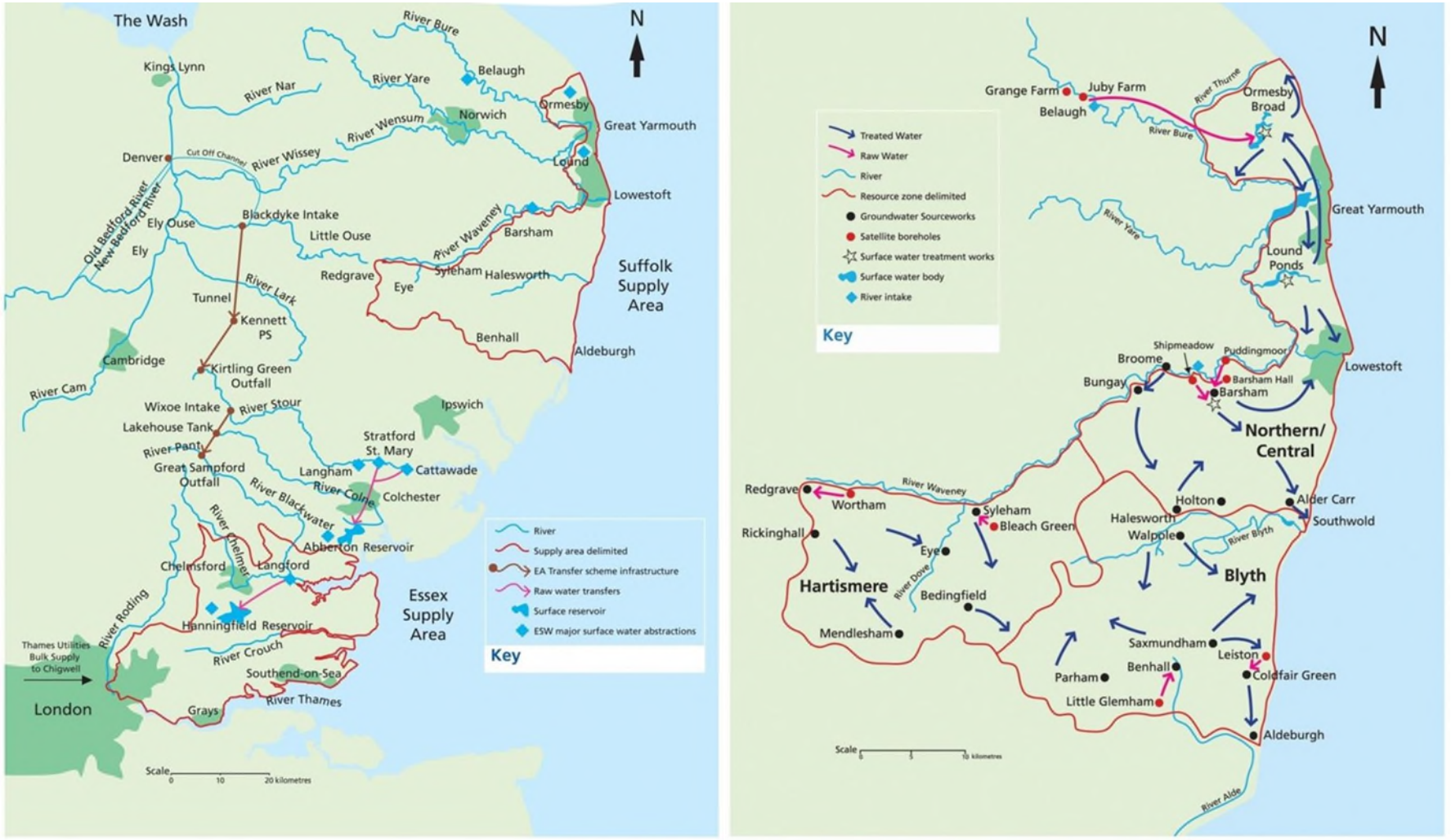
4 Water Company Water Resources Management Plans

4.1 Overview

We are currently preparing our draft Essex & Suffolk Water (ESW) Water Resources Management Plan 2024 (WRMP24) using methods set out in the Environment Agency and Ofwat Water Resources Planning Guideline. We will submit our draft WRMP24 to Defra and the Environment Agency by 31 August 2022 and a revised draft approximately one year later. The funding requirements for the WRMP24 final planning (i.e. the demand and supply schemes required to provide supply headroom), will be included in the company's PR24 Business Plan. However, this is unlikely to be approved until spring 2024.

Water resources planning is undertaken at a Water Resource Zone (WRZ) level. We have four WRZs as delineated in red in Figure 2 below - one in Essex called the Essex WRZ and three in Suffolk called Hartismere, Blyth and Northern Central respectively. The distribution network in the Essex WRZ is not connected to the Suffolk WRZs. Likewise, there is no connection between the Blyth and Hartismere WRZs and only minor connections between the Northern Central and Blyth WRZ.

Figure 2: Essex and Suffolk Water Resource Zones



Our WRMP24 will include a Baseline Supply Demand Balance for each WRZ taking account of:

- Our latest dry year supply assessments (known as Water Available for Use (WAFU)); and
- Our latest dry year demand forecast (known as Distribution Input (DI)). This includes our household and non-house demand forecast and water company side and customer side leakage.

Where supply is greater than demand, there is a supply surplus and conversely where demand is greater than supply, there is a supply deficit.

Where a supply deficit is forecast, an options appraisal is undertaken to identify demand management options to reduce customer demand and supply side options to increase available water resources. Each of the options or portfolio of options is then assessed against a series of WRMP objectives and best value metrics allowing a "Best Value" Water Resources Management Plan to be identified to ensure there is a supply surplus in each WRZ.

4.2 Supply Forecast

For our draft WRMP24, we have prepared a baseline supply forecast which sets out how much water we reliably have in each Water Resource Zone (WRZ) across the planning period, the latter being a minimum of 25 years. Our supply forecast is based on the deployable output of either individual sources or water systems. Deployable output is defined in the Water Resources Planning Guideline as:

The yield of a commissioned source, or group of sources constrained by:

- *Hydrological yield;*
- *Licensed quantities;*
- *Environment (through licence constraints);*
- *Pumping plant and/or well/aquifer properties;*
- *Raw water mains and/or aquifers;*
- *Transfer and/or output main;*
- *Treatment; and*
- *Water quality.*

We assess the deployable output of our sources against a number of drought scenarios. As required by the WRMP24 guideline, we have assessed our sources against historical and synthetic droughts.

In developing our supply forecast, we have taken account of:

- Water Industry National Environment Programme (WINEP) sustainability reductions (see Section 4.5 below). These are applied to the annual licensed quantities specified in our abstraction licences where the current annual licensed quantity has been demonstrated through WINEP investigations to be unsustainable. WINEP has been and continues to be a key consideration in our ability to provide a mains water supply SZC (see Section 4.5 below);
- the impact of the changing climate – we have used the latest CP18 Climate Projections; and
- Unplanned and planned outage at our Water Treatment Works.

4.3 Distribution Input (Demand) Forecast

For our draft WRMP24, we have prepared a baseline demand forecast known as a Distribution Input (DI) forecast. This is the total amount of water we need to input into our network (from our Water Treatment Works) in order to meet household and non-household customer demand and leakage from both our network and from customer's pipes. We will continue to refine our baseline forecast over the coming months prior to our supply and demand forecasts been locked down and submission of our draft WRMP24 in August 2022.

As required by the regulatory Water Resources Planning Guideline, population and property growth forecasts reflect Local Authority planned growth projections at a water resource zone level. Additionally, baseline household consumption forecasts have been uplifted to reflect changes in customer's behaviour and water use due to the Covid-19 pandemic. Work continues to understand the short to medium term impact of Covid-19 on our demand forecast. However, it has resulted in the higher demands in the early years of the planning period and has either reduced supply headroom or increased supply deficits where they exist.

4.4 Drought resilience

A key focus of the WRMP24 process is drought resilience. Previously, water companies have been required to provide a 1 in 200 year level of drought resilience where failure is defined as implementing an emergency drought order. For WRMP24, the water companies should aim to achieve 1 in 500 year resilience by 2039 at the latest. Planning to this level of resilience reduces water available for use, reduces supply headroom and possibly causes longer term supply deficits.

4.5 AMP7 Water Industry National Environment Programme (WINEP)

The AMP7 WINEP is a set of actions (investigations, options appraisal and implementation schemes) that the Environment Agency has requested water companies to complete between 2020 and 2025, in order to contribute towards meeting their environmental obligations. Our part of the WINEP includes the requirement for us to undertake abstraction sustainability investigations for all of our Suffolk groundwater abstraction licences.

While these investigations are undertaken, the EA has adopted the precautionary principle that water companies should maintain abstraction below a "Recent Actual" baseline to minimise the risk of deterioration of the environment. For ESW, this means we have taken the decision that we are are unable to agree to any new non-domestic requests in the Blyth WRZ for either new water supplies or to increase existing water supplies.

Our River Waveney abstraction licence is not in our WINEP. At the time the WINEP was developed, the Environment Agency did not consider that forecast increases in abstraction, as set out in our 2019 WRMP, posed a risk to causing deterioration against WFD objectives.

Therefore, as we were forecasting a supply surplus, we have worked with EDF to develop a supply scheme called the SZC Transfer Main. This would utilise the River Waveney licence headroom to supply SZC. However, a requirement of our Suffolk WINEP investigations was to investigate the sustainable level of abstraction for the

Environment Agency's River Waveney support scheme called the Waveney Augmentation Groundwater Scheme (WAGS). WAGS comprises five Chalk boreholes which discharge to the River Dove which is a tributary of the River Waveney. We are also required to investigate the impact of increasing abstraction from the River Waveney above levels forecast in our 2019 WRMP to confirm it will not cause an unacceptable risk of deterioration. The impact of WAGS sustainability reductions on our Northern Central Baseline Supply demand Balance is discussed in Section 4.7 below.

In assessing the sustainability of the WAGS scheme, our WINEP investigations have identified potential river flow deficits (as measured against flow targets) downstream of our River Waveney intake. Consequently, the Environment Agency has subsequently indicated by letter (dated 26 August 2021) that a sustainability change may be applied to our River Waveney abstraction licence annual licensed quantity. This change was not forecast in our 2019 WRMP because of the low risk of deterioration posed by our abstraction at the time. Since publication of our 2019 WMRP our demand forecast, including the water required to supply SZC, has materially changed and our WINEP investgiations have highlighted that fully licensed abstraction from the River Wavney is not sustainable. This has impacted on our supply headroom and therefore our ability to supply mains water to SZC.

The Environment Agency's letter, which was appended to our letter to the ExA dated 03 September 2021, confirmed that at this stage of our WINEP investigations, licence changes are likely to be required in order to protect the environment against planned significant increases in abstraction. The EA confirmed that in order for Water Framework Directive objectives to be met, it is very likely to need to vary both the WAGS and River Waveney abstraction licences. It has indicated what the new WAGS annual licensed quantities might be and we are currently updating our Water Resources system model to reflect these changes. We will then run the model to confirm how the sustainability reductions impacts the deployable output of our River Waveney WTWs and ultimately supply headroom in the Northern Central WRZ. This will be completed in September 2021 once the latest version of our Aquator model has been validated and approved for use. The EA also stated that depending on the final outcomes of the WINEP investigations, a ~60% sustainability reduction might be applied to the annual licensed quantity of our River Waveney licence. We will also model the effect of this sustainability reduction on deployable output during September 2021.

4.6 Environmental Ambition and Long Term Abstraction Destination

Another key focus of the WRMP24 process is Environmental Ambition. This is separated out into Long Term [Abstraction] Destination and Wider Environmental Ambition. In terms of Long Term Destination, the Environment Agency has undertaken national modelling to identify what sustainability reductions (over and above AMP7 WINEP sustainability reductions) might need to be applied to abstraction licence annual licensed quantities by 2050 to ensure that environmental objectives and targets are met and that water body catchments (e.g. rivers, lakes, reservoirs and groundwater aquifers), achieve "good" status. The main driver for these reductions is a potential change to higher river flow targets to ensure catchments remain resilient to the effects of climate change and future population growth.

The EA's National Framework catchment sustainability reductions have been applied to ESW abstraction licences as part of a Water Resources East project and currently

result in a ~50% reduction in ESW deployable output in 2050. These potential long term sustainability reductions drive significant supply deficits for ESW and if implemented, will require significant new supply schemes to restore supply headroom.

Further refinement of the Long Term Destination modelling will be undertaken over the following 6 months which might reduce the required sustainability reductions. Nevertheless, it is clear that further reductions in abstraction licence annual licensed quantities in the medium to long term future may be required.

We are currently consulting our customers and stakeholders on Long Term Destination and are asking for their views on both the size of the sustainability reductions and also the pace of introducing them.

4.7 ESW WRMP24 Baseline Supply Demand Balance

Based on our latest supply and demand forecasts, we are forecasting a supply deficit of ~7.5Ml/d in our Hartismere Water Resource Zone and a supply deficit of ~2.5Ml/d in our Blyth Water Resource Zone.

The position in the Northern Central WRZ is now less certain following the latest results of our WINEP investigations and the EA indicating it may reduce the annual licensed quantity on our River Waveney abstraction licence as well as the annual licensed quantity on their Waveney Augmentation Groundwater Scheme (WAGS) abstraction licence.

Once the WINEP investigations for the River Waveney and WAGS licences have concluded and new annual licensed quantities have been agreed with the EA, we will then need to update and re-run our water resources models to confirm the deployable output of our River Waveney WTWs and the headroom position for the Northern Central WRZ as a whole.

It should also be noted that we are currently moving across to a new version of our water resources modelling software for the River Waveney. The new Aquator XV software may result in a slightly different deployable output compared to the earlier version.

Our environmental consultants have been asked to expedite the additional modelling but have confirmed that it cannot be completed earlier than 24 September 2021. Tasks include model updates, model runs, post-processing of model output data and reporting. The EA plan to provide likely new annual licensed quantities for our abstraction licences within the following two weeks. We will concurrently run our system model with the revised likely annual licensed quantities for the River Waveney and WAGS abstraction licences to confirm the deployable output for the River Waveney and to confirm how this impacts our supply surplus in the Northern central WRZ. The level of baseline supply headroom will help to inform whether we are able to supply SZC without having to deliver new supply schemes.

4.8 ESW WRMP24 Options Appraisal and Best Value Plan

4.8.1 Overview

Where initial WRMP24 baseline supply demand balance calculations confirm a WRZ supply deficit, options appraisal is undertaken to identify a series of supply and demand options, some of which will form the final preferred plan in the WRMP24.

Baseline supply deficits have been confirmed for the Blyth and Hartismere Water Resource Zones in Suffolk. There is a risk that significant changes to the River Waveney and WAGS annual licensed quantities could cause a supply deficit in the Northern Central WRZ too.

Consequently, we are undertaking an options appraisal as part of our WRMP24. This process appraises a series of demand and supply side options and using a series of agreed metrics (including capital and operating costs), will identify a best value plan. We have identified a series of "feasible" options from a wider list of unconstrained options, the former of which is summarised in the table below.

Water Resource Zone	Demand side Options	Supply Side Options
All	Metering (including compulsory smart metering)	
All	Leakage Reduction (including 50% reduction of 2019/20 leakage by 2050)	
All	Water Efficiency to reduce per capita consumption PCC to 110l/h/d.	
Northern Central		**North Suffolk Winter Storage Reservoir** This would be filled with surplus winter water in the River Waveney and / or the Hundred River.
Northern Central		**Desalination Plant (Great Yarmouth)** This is a water Resources East Strategic Resource Option.
Northern Central		**Effluent Reuse Plant** Located near Lowestoft.
Blyth		**Small winter storage reservoirs** These would be used to discharge water into rivers during river low flow conditions to maintain river flows above target levels.
Blyth		**River Waveney WTWs export to Blyth WRZ** This would require a new River Waveney WTWs to Blyth WRZ transfer main. If there is a deficit in the Northern Central WRZ, this option would also require one or more of the Northern Central WRZ options as detailed above.
Hartismere		**Import from Anglian Water** This is dependent on an export from our Essex WRZ to Anglian Water's strategic network.
Hartismere		**Import from Blyth WRZ** This would require a new transfer main to connect the Blyth and Hartismere WRZs. The option would be dependent on the River Waveney WTWs export to Blyth WRZ which in turn could be dependent on the Northern Central WRZ options detailed above.

Outline designs and costs have been prepared for some of the above supply schemes and others are currently being prepared. Over the coming months, all options will be subject to varying levels of environmental assessment with the final plan being full assessed through an integrated environmental assessment covering Strategic Environmental Assessment, Habitats Regulation Assessment and a Natural Capital Assessment.

Options may be discounted over the coming months should unalterable constraints be identified that make them unsuitable for promotion. For example, unacceptable environmental impacts that cannot be overcome or options which have a high risk of failure.

4.8.2 Implications of ESW Supplying SZC on its draft Water Resources Management Plan 2024

Overview

Supply deficits are currently forecast in both the Hartismere and Blyth WRZs in Suffolk.

Blyth WRZ

Our intention over the previous two years has been to restore supply headroom in the Blyth WRZ utilising abstraction licence annual licensed quantity and WTWs headroom at River Waveney WTWs – even if we were to supply SZC. However, it is now clear based on our latest supply and demand forecasts, WINEP conclusions to date and the EA's intention to reduce our Waveney annual licensed quantities, that agreeing to provide SZC with the full peak 4Ml/d during construction and the full peak 2.8Ml/d once the power station is operational, could compromise our ability to resolve supply deficits in Blyth WRZ using any surplus we might have at our River Waveney WTWs.

Hartismere WRZ

The main option for restoring supply headroom in the Hartismere WRZ was a treated water import from Anglian Water. However, this is only feasible subject to an export of treated water from our Langham WTWs in our Essex WRZ into Anglian Water's strategic network. However, our initial (August 2021) WRMP24 Essex supply demand balance has confirmed a supply deficit which is due to an increase in customer demand (the Coronavirus pandemic has increased per capita consumption at a time when it should be reducing), the use of a different deployable output (supply) assessment methodology (as required by the Water Resources Planning Guideline) and significant reductions in deployable output due to climate change and the use of the latest CP18 climate projections. We are making further refinements to the Essex WRZ supply and demand forecasts and we do expect the supply deficit to reduce in size. However, there is now a significant risk that if our Essex WRZ has insufficient supply headroom to enable the Anglian Water export to our Hartismere WRZ, we will need to consider schemes in Essex which utilise Reverse Osmosis technology to close the deficit including effluent reuse and desalination. Additionally, we will continue to assess how we utilise any supply surplus we might have (if any) in the Northern Central WRZ too (i.e. the WRZ which would supply the Sizewell C Transfer Main).

Northern Central WRZ

Depending on the final outcomes of WINEP and our final headroom position, we may need to develop options that might include effluent reuse and / or desalination

schemes in the Northern Central WRZ regardless of whether we supply SZC. Such schemes would be promoted through our regulatory water resources planning process, and it would fall to our customers to fund these schemes. However, if we were to agree to supply SZC, the number and/or size of these scheme would be larger than otherwise would be the case.

5 NWL and Sizewell C Co Liaison

NWL has engaged proactively and constructively with SZC Co's technical teams and directors with a view to finding a sustainable and resilient mains water supply to the proposed SZC site.
In 2019, we attended adhoc meetings with SZC Co in relation to mains water supply. This included a wider stakeholder water workshop in Ipswich on 27 November 2019.

The frequency of the SZC Co Mains Water Supply meetings increased with weekly meetings being held during 2020 and 2021 to:

i. progress the design of the Sizewell C Transfer Main; and
ii. track the status and outcomes of our Water Industry National Environment Programme (WINEP) investigations.

A meeting was held on 9 October 2020 between NWL and EDF CEOs and it was agreed that NWL would continue to work with SZC Co to find a mains water supply scheme albeit noting potential WINEP constraints. Further adhoc meetings have also been held between SZC Co and NWL directors.

6 NWL Position

In summary:

i. We continue to forecast a supply deficit in the Blyth Water Resource Zone within which the Sizewell C site is located. Consequently, we are unable to provide any mains water to the Sizewell C site from the local Blyth WTWs.

ii. We have identified a supply scheme called the Sizewell C Transfer which uses headroom at our River Waveney WTWs. However, the viability of this scheme is dependant:
   a. on maintaining sufficient annual licensed quantity on both our River Waveney abstraction licence and also on the EA's WAGS licence which supports our river Waveney licence; and
   b. maintaining sustainable and resilient supplies to our existing customers.

iii. Following review of our interim WINEP investigations, the EA wrote to us on 26 August 2021 and has confirmed that it is likely that significant sustainability reductions may need to be applied to our River Waveney abstraction licence. This could be a material change to our supply demand balance forecasts and could reduce our supply headroom to a level whereby we are unable to supply SZC.

iv. The potential sustainability reduction on the River Waveney abstraction licence not only has implications for the Northern Central WRZ but also for our Blyth and Hartismere WRZs. This is because any Northern Central WRZ supply surplus could be transferred to the other Suffolk WRZs to eliminate supply deficits in those WRZs.

v. Our actual supply headroom position will not be known until our WINEP investigations have concluded and we have agreed with the EA what the new annual licensed quantities on the River Waveney and WAGS abstraction licence will be. We expect the additional WINEP modelling to be completed by 24 September 2021. The Environment Agency will then require an additional 2 weeks to review the results of the additional modelling and to conclude what the likely annual licensed quantities for our River Waveney abstraction licence and their WAGS abstraction licence should be. Until then, we are unable to confirm whether / when we can supply SZC.

vi. WINEP sustainability reductions to our River Waveney abstraction licence and to the EA's WAGS abstraction licence might be of a size that cause baseline supply deficits. The Environment Agency currently requires abstraction licences to be modified to reflect WINEP outcomes (i.e. reductions in abstraction licensed quantity) by 2027. Consequently, new demand and supply schemes will need to be operational by that date to restore supply headroom in each of the WRZs. Given the scale of the supply deficits across our WRZs, further discussion with the Environment Agency around when the licence changes are made is required.

vii. We are undertaking our WRMP24 options appraisal to identify a best value plan to restore supply headroom. Among other options, we are considering local mitigation options including river support schemes as well as new supply schemes including but not limited to effluent reuse and desalination schemes.

viii. If WINEP and WRMP24 options appraisal is required for the Northern Central WRZ, then we will not be able to confirm whether we can supply SZC until our regulators have approved our WRMP24 in 2023 and Ofwat, our economic regulator, has approved our PR24 (Price Review 2024) Business Plan which is unlikely to be before Spring 2024.

ix. The Environment Agency has set out its expectations regarding regional environmental ambition and reducing abstraction further by 2050. It has identified further sustainability reductions which once implemented, would cause significant baseline supply deficits. The size of these deficits will need regional strategic resource options (identified by Water Resources East) to restore supply headroom and include a new winter storage reservoir on the Fens and Desalination Plants.

x. Therefore, to conclude:
   a. the WINEP and WRMP24 process has progressed significantly and our supply demand position has recently changed such that potentially we are now unable to supply SZC; and

b. if we were to agree to supply SZC, we risk needing to develop presently undefined effective supply schemes that we might otherwise have not needed, or to develop larger supply schemes.