WRE

WATER RESOURCES EAST

Supply-side options development

Regional Water Resources Plan for Eastern England

December 2023

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Table of acronyms

ASR	Aquifer Storage and Recovery
dWRMP	Draft Water Resources Management Plan
EBSD	Economics of Balancing Supply and Demand
RAPID	Regulatory Alliance for Progressing Infrastructure Development
rdWRMP	Revised Draft Water Resources Management Plan
SRO	Strategic Resource Option
T&F	Task and Finish
UKWIR	UK Water Industry Research
WRE	Water Resources East
WRMP	Water Resources Management Plan
WRPG	Water Resources Planning Guidance
WRSE	Water Resources South East
WRW	Water Resources West
WRZ	Water resource zone
WTW	Water treatment works

1. Introduction

The challenges faced by water users in the East of England are significant. Without action, it is likely that households will not at times be able to turn on the tap and expect a reliable supply of water. Non-household users may not be able to rely on their existing water supplies and new businesses wishing to set up in the region may find water supplies are unavailable.

Even with water companies' demand management plans, there needs to be further investment in supply-side options. These supply-side options are not as easily available in the region as they perhaps were historically. Climate change, abstraction reductions and increased drought resilience mean that conventional treatment options fed by groundwaters or surface waters are limited with only a small number of opportunities for additional water storage identified, such as the Fens and Lincolnshire reservoirs.

This means we must explore supply-side options that are not yet common in the United Kingdom in order to maintain water supplies. These options include desalination and water reuse. These have been explored at a regional level, promoting collaboration between water companies and stakeholders.

As each supply-side option has its benefits, costs and risks, it has been important to ensure a consistent approach to how each water company's supply-side options have been represented within Water Resources East's models, allowing for a robust regional plan to be developed.

This report discusses how this was achieved, starting from an independent gap analysis and review, through to the next steps envisaged for these supply-side options.

2. What is a supply-side option?

A supply-side option describes an investment that could be developed in order to supply additional water. Different types of supply-side options have entered the WRE's regional modelling processes.

Reservoirs

A reservoir is a store of water, some are naturally occurring and others man-made. We often use them to create a balance between when water is available and when it is needed. In the water industry they fall into two main categories:

- Service Reservoir – these store treated potable water that is ready to be used. They are usually created to balance supply and demand – it enables water abstractors to stay within abstraction licence constraints at the same time as meeting peak demands.
- Storage Reservoir – a storage reservoir or winter storage reservoir is a body of water created to store excess river flows in wet conditions, usually the winter months, and then utilise it during dry summer months or during a drought. The water is stored in an untreated state so it can be used for multiple purposes.

Water reuse

In the context of this plan, water reuse is taking final effluent from a water company waste water treatment process and repurposing it. The options considered here would take this water and pass it through an additional advanced treatment process to bring it up to the required regulatory standard, before discharging it into a watercourse or reservoir. This makes additional resource available for abstraction from that waterbody. In this plan, this water has been considered as additional resource available for public water supply but it may be abstracted and used for other non-household purposes. In some industrial settings the water can be used directly or after further treatment.

Desalination

Desalination is the process of removing salt from seawater to make it usable as fresh water. However, when we talk about desalination, we are usually referring to the whole process, from the point where we abstract water from the sea to it being fit to supply to the end user.

Pre-treatment will usually consist of screens to remove larger debris, a clarification stage, sand filters and finally ultra-filtration membranes. By the time water has passed through pre-treatment it will appear clean and clear. However, some soluble compounds will still be present, including salt.

In order to remove the salt and the other remaining minerals the cleaned water will be put through a reverse osmosis process. This process will remove the majority of the remaining minerals make the water suitable for most uses, including drinking water.

However, at this stage the water is very 'aggressive'. Having had all of the minerals removed from it is very corrosive and would cause damage to pumps, pipes or concrete structures, so it has to be remineralised and pH corrected before it can be pumped and piped to where it's needed.

Transfers

Transfers are a means of moving water from one location to another. This may be necessary where there is a surplus of water in one place and a need for additional water in another. Either treated drinking water or raw water can be transferred, depending on the need and purpose.

Raw water can be transferred in different ways; by open channel – this is where water is moved from one waterway to another, such as via rivers or canals. This can be done to make more water available for abstraction in the receiving waterway. There is usually an element of pumping and pipes required to make this possible, but they can often rely on the natural flow of water or by lock and sluice management. This kind of transfer can be an efficient way of moving water inter-regionally.

Raw water can also be moved around using pipelines. Depending on the topography of the land these can be pumped or exploit gravity.

Treated potable water is normally transferred by pipelines. We can do this when we have capacity to produce more treated water than the customer need in a particular area. Potable transfers make it possible to get that water to where customers need it.

In some emergency situations potable water can also be transferred by tankers.

Aquifer storage recovery

Aquifer storage and recovery (ASR) is a technique used to replenish and store groundwater in aquifers for subsequent abstraction and supply. There aren't any ASR schemes currently operating within the WRE region, and there are only limited operational examples in the UK.

Sea tankering

The process of sea tankering involves importing potable water from outside of the UK into UK ports by sea tanker. The option could be used to guarantee water resilience at times of high demand in water networks or during drought events. The water is delivered from the tanker to a service reservoir then on to an existing WTW.

Supernatant return

Backwash recovery is a means of maximising the utilisation of resource available by recycling water from existing treatment processes that would normally be discharged to the environment.

The bulk of this water that can be recovered is from filter backwashing processes. Groundwater sources with high levels of iron and manganese will typically have an oxidation process followed by rapid gravity sand filters for solid/liquid separation. Periodically the filters have to be backwashed, to remove the build-up of solids within the sand bed, in order to maintain the optimal performance. The backwash water from this process is captured in washwater recovery tanks. This is then normally settled over several hours, with the clean water from the surface being decanted to the environment leaving the sludge behind.

Backwash water recovery is the process of returning that settled water to the front end of the treatment process rather than discharging it to the environment. The sludge is still retained in the washwater recovery tanks from where it can be transferred to a sludge holding tank and subsequently tankered to water recycling centre. Here the sludge may be further dewatered, and the freshwater discharged to the environment via the water recycling centre outfall.

Conjunctive use

Conjunctive use is where water resources are shared between different water companies and users. There are a few instances where a company possesses a consumptive abstraction licence that is not being fully utilised. Another user could purchase the unused volume within these licences, abstract and treat it, to support their own supply needs.

3. Conducting a supply-side option gap analysis

In order to refine the development of supply-side options, an independent consultant was engaged to undertake a gap analysis and review each of WRE's member water companies' supply-side development processes and documentation. The aim of this was to identify any differences in supply-side screening approaches and suggest further work to address any gaps, thus facilitating a consistent approach for the development of the Regional Plan.

3.1 Review and analysis

The following data compilation, review and analysis was undertaken:

- A review of the alignment of option types and methodologies with the National Framework and emerging Water Resources Planning Guidelines (WRPG) and other relevant documentation.
- The Environment Agency's informal feedback on the WRE Method Statement was reviewed and summarised.
- A review and summary of the company option screening methodologies was undertaken.
- A list of regional unconstrained and constrained options was compiled.
- Gaps were highlighted in option types or option lists.

3.2 Recommendations

The following recommendations were made from the gap analysis:

Process improvements

- Adopt bridging processes to support collaboration and alignment between WRE and water companies.
- Develop a process to assign ownership of supply-side options.
- Adopt a process for each water company to support identification of water reclamation options.
- Adopt a common approach for identifying joint or shared assets.
- During generation of Water Resources Management Plan 2024 (WRMP24) options it would be useful to adopt a consistent approach to the application of the UKWIR generic options.
- Quality check of rejection registers as part of the WRMP24 screening process.

Defining an option

- Define the criteria for WRE options and incorporate this into the water company screening process and adopt a process for developing the WRE option list from the WRM24 option lists.
- Adopt minimum standards of detail for WRE options and by extension WRMP options.

Developing supply-side options

- Establish a more proactive third party/cross sector identification approach.
- Desalination options should be identified and assessed at a regional level including consideration of different operational configurations.
- Identify possible regional level schemes for effluent reuse.

4. Establishing WRE supply-side option processes

4.1 Achieving consistency

It was recognised early in the development of the Regional Plan that a consistent approach was required to ensure that all supply-side options were comparable. As each water company was responsible for developing its own supply-side options list which would feed into the WRE process, it was identified that a set of bridging procedures would be needed to ensure this consistency.

This was achieved by the implementation of an Options and EBSD Task and Finish (T&F) group.

Options and ESBD Task and Finish group

The different water companies are represented at this T&F group, as well as representatives from the environmental assessment team. Guests are invited as and when needed. The aims of the group are to:

- Initiate a gap analysis and review of WRMP19 options, with the aim of improving individual company methods as well as establishing bridging processes for WRE.
- Determine whether there are any gaps in option types and work together to improve this.
- Determine the criteria for what constitutes a WRE supply-side option, and review as needed.
- Explore possible third-party supply-side options and/or multi-sector options.
- Coordinate opportunities between the companies, such as the sharing of potential resources like desalination or the transfer of treated water between companies.
- Liaise with the Strategic Resource Option teams to ensure that accurate information is being used in the WRE process.
- Feasibility of supply-side options, taking learning from each other to improve and challenge.
- Agree the list of WRE supply-side options to be used in the decision-making process.

One to one liaison

All the companies also work together on a one-to-one basis, in order to discuss the practicalities of option ownership and to discuss any other feasible collaboration opportunities. These discussions are conducted at both a regional and a local level.

4.2 Establishing bridging processes for supply-side options

The Options and EBSD T&F group established a process for how supply-side options would be integrated into WRE's regional models. This consisted of:

- An initial screening against the WRE option criteria.
- A high level environmental screen.
- Entry onto a common WRE supply-side option spreadsheet.

- Application of optimism bias and cost curves.
- All supply-side options remaining proceeded to the modelling stage.

Initial screening against WRE option criteria

As the first step in the process, it was essential that each company established their feasible list of supply-side options. This list would then be screened against agreed criteria to establish whether the option was a WRE supply-side option. If it was, it then entered the WRE options list which was administered by an independent consultant in order to ensure consistency in data. The option also remained a WRMP24 option for the individual water company.

If the company supply-side option did not meet the criteria for being a WRE supply-side option, it remained solely on the company's WRMP24 options list.

High level environmental screening

If the option was put forward, it was subject to a high-level environmental screening assessment. This could be undertaken either through WRE or the individual company, with a record being kept by WRE.

If the option failed this high-level environmental screening assessment, it was scrutinised to determine if any mitigation could be put in place. If not, the option was rejected. If mitigation could take place, the option would be revised to include it and the option submitted again for a revised high-level screen.

If the option passed its high-level screen it proceeded onto the WRE supply-side options list.

Entry onto the WRE supply-side options list

The options were then entered onto the WRE options list, adhering to a common framework which detailed the information expected from each of the companies. This was administered by an independent consultant, ensuring consistency and challenge.

Optimism bias and cost curve application

Once the supply-side options had been entered onto the spreadsheet, optimism bias was applied. This had been agreed, at an option type level, by the WRE Alignment Group. Cost curves applicable to the option type, or in some instances specific options, were also applied.

Modelling

The supply-side options then proceeded to the modelling and decision-making processes stages, as described in the Decisions and Processes report.

Iteration

Due to the iterative nature of water resource planning, some supply-side options were rejected at a company level during the WRE modelling stage. When this occurred, the option was rejected on the WRE supply-side option list, and a reason recorded for why this occurred.

Discussion between the companies at the Options and EBSD T&F group and later at the WRE Alignment Group also captured any new options that had been developed through the WRMP24 processes.

The optimism bias and cost curves were updated at several points through the development of the Regional Plan by external contractors, following the development of options through the WRMP24 process.

4.3 Defining a WRE supply-side option

Each water company developed their supply-side options, following their own method statements and processes. Once companies had started to establish this options appraisal process, it was important to understand how these options would be taken forward into WRE's supply option list.

WRE supply-side options for the Emerging Regional Plan

For the Emerging Regional Plan, published in January 2022, a WRE regional supply-side option was defined as:

- greater than 10 Ml/d;
- could benefit the region or another water company, for instance one company's water recycling plant benefitting another company;
- is multi-sector, for example collaborations with non-public water supply organisations;
- involves multiple water companies/crosses water company boundaries, for example water transfers between water companies;
- assessment at a regional level is logical e.g. desalination; or
- supports the regional environmental destination.

Refining the definition of a supply-side option for the Draft Regional Plan

The gap analysis undertaken for WRE highlighted that smaller schemes with the potential to benefit the wider region could be missed and it was recommended that broader criteria be established. This was also a theme within the feedback from consultation responses for the Emerging Regional Plan. This recommendation was discussed at the WRE Options and EBSD T&F group and a new definition of a WRE regional supply-side option developed and then agreed by WRE Alignment Group. This meant any supply-side options providing a benefit greater than 1 Ml/d were included in the modelling processes. All other definition categories remained the same.

Information required for the WRE supply-side option list

Once it had been determined which options were to proceed into the WRE decision making process, the Options and EBSD T&F group and an independent consultant developed a minimum level of information that WRE needed from each water company, according to option type. Examples of this information are shown below:

- Option name.
- Option description.
- Abstraction source/location and WRZ.
- Deployment location and WRZ.
- Option type.
- Unique ID.

- Deployable output.
- UKWIR category.
- Option ownership.
- Timeline for development and implementation of option.
- Rejection reason (if rejected).

These details were then collated for each option type by an independent consultant on a common form.

4.4 Developing supply-side options

Whilst each company was responsible for developing its own supply-side options, as part of its WRMP24, it was acknowledged that there were further opportunities to explore at a regional level. These included desalination, cross sector options and effluent reuse.

Transfers also had to be considered separately as the water resource zones for WRE are different from the water resource zones used by the individual water companies.

Desalination

It was determined that a screening exercise should be undertaken along the length of the WRE coastline, considering limiting factors such as proximity to power sources, suitability for intake/outfall structures and consideration of environmentally sensitive areas. New opportunities for co-locating infrastructure were also to be considered.

The results of this screening exercise were discussed at a WRE level and ownership attributed. These options were then taken forward into the Regional Plan and respective WRMP24s.

Cross sector options

It was identified that a more proactive approach could be undertaken to realise more cross sector options, especially considering the wide and varied stakeholder membership enjoyed by WRE. This has been explored as part of the Regional Plan process and will continue to develop by liaison with fellow abstractors and other industrial users.

Water reuse options

The review of WRMP19 options identified that some possible water reuse options were not identified as supply-side options. A screening exercise was completed for the water recycling plants in the WRE area and options discussed between companies. Ownership of the option was then established, and the option adopted into that company's WRMP24 constrained list.

Transfers

Connectivity between water resource zones needed to be explored to determine what transfers needed to be developed in order to allow the modelling process to determine the best outcome for the region.

In some instances, this involved feasible water company transfers being combined in order to establish successful connections between water resource zones. New transfers were also developed in some cases, such as connections between different company water resource zones.

Other supply-side options

All other options were established in the individual company's options appraisal process, which was aided by the WRE gap analysis that was undertaken.

5. Challenging the supply-side options

The cross-sector membership of WRE has ensured that the supply-side options have been able to be challenged and assured, by water companies, regulators and other members.

Quality assurance

As part of the development of the WRE supply-side options list, a series of workshops were held between the water companies, modelling teams and consultants to discuss each supply-side option line. This also resulted in some options being refined, for instance details of the operating regime of the aquifer storage regimes or being rejected due to duplication.

After these workshops, each company assured that their options had been captured correctly by the independent consultants.

Regulator liaison

Individual water companies have regular liaison meetings with the Environment Agency. As part of these individual water company options have been discussed. The WRE supply-side option set was also discussed with the Environment Agency and Natural England in June 2021.

WRE Board focus sessions

The supply-side options from the Emerging Plan were also presented and challenged by the WRE Board during two focus sessions. This process was repeated for the supply-side options from the Draft Plan, through another WRE Board focus session.

6. Cost curves

Cost is one of the performance metrics used in the regional simulator to assess supply options and inform decision making. To achieve this, high-level cost curves were developed for each supply-side option type to inform economic analysis and inform supply-side option selection. These cost curves have been used to evaluate the capital (CAPEX) and operating (OPEX) costs of the supply-side options.

6.1 Cost curve development

An independent consultant was engaged to create and/or update these cost curves for the following supply-side options:

- **Creation of the desalination cost curve: seawater and brackish water**
  Generic seawater and brackish water cost curves were originally developed and underwent a first round of updates in 2021. These included updating the cost curves to include a service reservoir and to reflect the process flow diagrams for Anglian Water and Essex & Suffolk Water's seawater and brackish desalination options.
- **Creation of barge desalination cost curve**
  The barge desalination cost curve was created in 2021, using information from a

supplier and supplemented with other equivalent scale international projects and independent cost curves. A service reservoir was also included. No allowance was made for onshore remineralisation.

- **Creation of the water reuse cost curve**
  A cost curve was created in 2021 using data from the process flow diagrams developed for WRMP24, equivalent international projects and independent consultant cost data.
- **Creation of a conventional treatment and conjunctive use cost curve**
  The 2021 cost curve for conventional treatment is based on the process flow diagram used for Anglian Water for WRMP24, with costings coming from international project examples and independent cost data. The conjunctive use curve is the same as the conventional treatment curve but has the addition of supplier costs developed between a water company and a power company. A service reservoir provision was also included.
- **Creation of a sea tankering cost curve**
  A 2021 cost curve was created based on a supplier proposal. Also included in the costings are a service reservoir, pipeline from tanker to the service reservoir and provision for breakpoint chlorination and conditioning.
- **Transfers**, **aquifer storage and recovery**, and **new raw water reservoirs** remained as developed in 2018.

6.2 Cost curves updates

Further revisions were commissioned in 2023 for all supply-side options. The default value for power cost was updated to align with the power cost used in the Anglian Water dWRMP24. Similarly, the WRE cost curves were inflated to reflect a cost base of Q3 2022 in alignment with Anglian Water's dWRMP24.

These updates were integrated into the regional simulator and EBSD where appropriate. For the SRO schemes, more up to date scheme specific costs have been developed by the water companies through the RAPID gated process, which were then used in the water company rdWRMP24s. These costs were used in the WRE simulator and EBSD for these schemes.

7. Optimism bias

Optimism bias is a tendency recognised by HM Treasury for appraisers to be over optimistic about key project parameters, including capital costs, operating costs, project duration and benefits delivery. The background to optimism bias and guidance on its application to infrastructure projects is provided by HM Treasury in their publication 'The Green Book'[1], and its associated supplementary guidance note.

A technical note[2] (the 'All Company Working Group Methodology') was prepared in August 2020 to set out a consistent approach and methodology for applying optimism

[1] HM Treasury (2020), The Green Book – Central Government Guidance on Appraisal and Evaluation.
[2] Mott MacDonald (2020), Cost Consistency Methodology, Technical Note and Methodology.

bias amongst the nine water companies involved in the Strategic Water Resource Options. This approach has been applied for WRE and is shown in Figure 1.

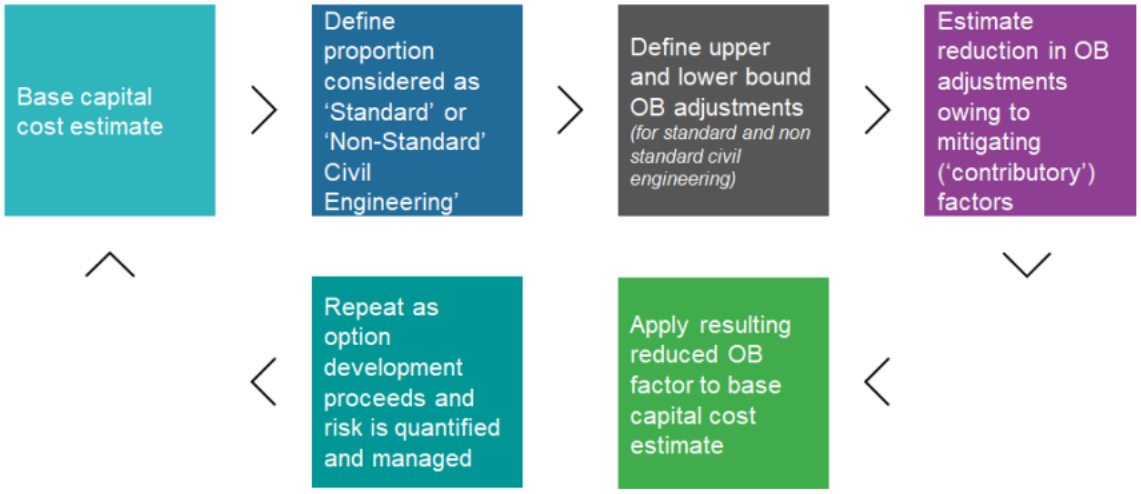

Figure 1: Optimism bias calculation overview

This means that optimism bias is calculated based on the degree of development of an option, and the confidence in cost estimates made at that time. As option development proceeds, confidence in the cost estimate will improve as specific risks are defined and quantified.

When this occurs, optimism bias should then be recalculated and would be expected to decrease as there is a higher confidence that contributory factors are well understood and built into the quantified risk costs.

Applying optimism bias to WRE supply-side options

An independent consultant took the methodology and approach from the All Company Working Group and structured it so that the different WRE supply-side option types, and any sub-components, could be assessed against the criteria.

Each option type was assessed at Alignment Group and the optimism bias agreed. This was then carried through to the WRE supply-side options list. These are shown in Table 1.

The optimism bias for reservoirs and transfer options was adjusted in February 2023 to align with the SRO Gate 2 values, as they have been developed further than other options in the constrained list. The optimism bias of all other options remained as they were developed in 2021.

Table 1: Optimism bias applied to different options types

Option type	Optimism bias applied
Desalination - Terrestrial seawater multi-sector	56.9%
Desalination - Terrestrial seawater non-potable	59.3%
Desalination - Terrestrial seawater	59.3%
Desalination - Terrestrial brackish water multi-sector	56.9%
Desalination - Terrestrial brackish	59.3%
Desalination - Offshore barge	57.9%
Desalination - Quayside barge	57.9%

Desalination - Terrestrial seawater (site specific)	59.3%
Effluent reuse	57.9%
New Reservoir	37.4%
Sea tankering	35.6%
Aquifer Storage & Recovery	32.2%
Additional treatment	26.2%
Option related treatment	26.2%
Transfer - Polyethylene	19.7%
Transfer - Ductile Iron	19.7%
Transfer - Steel	19.7%
Conventional treatment	20.3%

8. Updates to WRE supply-side options since the draft Regional Plan

Following on from feedback from the draft Regional Plan consultation, there have been amendments to the WRE supply-side options list.

This includes the addition of nine options that have been produced through the water company's WRMP24 development, following discussions in the WRE Alignment Group.

Another new option was developed through the regional reconciliation process. This is a temporary transfer from Anglian Water to Cambridge Water, to support Cambridge through a critical period from 2031/32 until 2035/36. This is enabled through the reduction of an existing transfer from Grafham Water to Affinity (known as a reverse or 'virtual' trade) within the WRSE region, which is in turn facilitated by the Minworth to Grand Union Canal transfer between WRW and WRSE.

The potential yield of the Lincolnshire and Fens reservoirs has been updated in the simulator and EBSD. This is to help provide evidence on the need for and sizing requirements of the two schemes, and further support Anglian Water and Cambridge Water's work in response to the RAPID Priority Action detailed in the Final Decision documents for both Fens and Lincolnshire reservoirs at gate two.

The updated list of feasible supply options is included in Annex A.

The rejection register has been reviewed since the draft Regional Plan. This has led to the screening out of several options following further assessment of environmental concerns. Most notably, this includes the rejection of all brackish desalination options. The rejection register is included in Annex B to this report.

Annex A: Supply options for each water resource zone

Please note that the WRE option IDs differ from the WRMP24 option IDs.

1.1 Lincolnshire West Notts WRZ

1.1.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
08a-0048	LNC14	ASR	Sherwood Sandstone	7	Yes	Yes
LNC30	LNC30	Water treatment works loss recovery	Hall WTW Enhancements	3.2	Yes	Yes
LNW6	LNN3	Groundwater enhancement	Lincolnshire Retford and Gainsborough resource optimisation	0.4	Yes	Yes
LNW7	LNC28	Conjunctive use	Trent trade	7	Yes	Yes

1.1.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
02a122024r	02a_1220_24_Rev	Ruthamford North	Lincolnshire West Notts	10
LNW1	02a_1220_24_Rev	Ruthamford North	Lincolnshire West Notts	50
LNW2	02a_1220_24_Rev	Ruthamford North	Lincolnshire West Notts	100
LNW3	02a_1220_24_Rev	Ruthamford North	Lincolnshire West Notts	200
LNW4	LNC25	Lincolnshire East	Lincolnshire West Notts	29

1.2 Blyth WRZ

1.2.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
DES3A	SUE14	Desalination	Sizewell desalination (seawater)	25	Yes	Yes
DES3B	SUE15	Desalination	Sizewell desalination (seawater)	50	Yes	Yes
DES3C	SUE16	Desalination	Sizewell desalination (seawater)	100	Yes	Yes

1.2.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
ESWTRA010	ESW-TRA-010	Suffolk East	Blyth	10
ESWTRA012	ESW-TRA-012	Hartismere	Blyth	10
ESWTRA001	ESW-TRA-001-1of4	Northern Central	Blyth	10
BLY12	ESW-TRA-010	Suffolk East	Blyth	20
BLY7	ESW-TRA-010	Suffolk East	Blyth	50
BLY8	ESW-TRA-010	Suffolk East	Blyth	100
BLY9	ESW-TRA-010	Suffolk East	Blyth	200
BLY10	ESW-TRA-012	Hartismere	Blyth	20
BLY1	ESW-TRA-012	Hartismere	Blyth	50
BLY2	ESW-TRA-012	Hartismere	Blyth	100
BLY3	ESW-TRA-012	Hartismere	Blyth	200
BLY11	ESW-TRA-001-1of4	Northern Central	Blyth	20
BLY4	ESW-TRA-001-1of4	Northern Central	Blyth	50
BLY5	ESW-TRA-001-1of4	Northern Central	Blyth	100
BLY6	ESW-TRA-001-1of4	Northern Central	Blyth	200

1.3 Lincolnshire East WRZ

1.3.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
DES52	SHB6 / 7	Desalination	Desalination (seawater) on the South Humber Bank feeding the non-potable network	25	Yes	No
DES26D	LNE5	Desalination	Desalination at Mablethorpe – Onshore	25	Yes	Yes
DES26E	LNE6	Desalination	Desalination at Mablethorpe – Onshore	50	Yes	Yes
DES26F	LNE7	Desalination	Desalination at Mablethorpe – Onshore	100	Yes	Yes
03a90	SHB3	Water Reuse	Pyewipe WRC (non potable)	0	Yes	No
03b0094A	LNE1	Water Reuse	Ingoldmells to Covenham via River Eau (with additional treatment at Covenham)	6.1	Yes	Yes
COVEWW	LNE3	Water treatment works loss recovery	Backwash water recovery, East Lincolnshire WTW	1.3	Yes	Yes
LNE11	LNE11	Groundwater enhancement	Lincolnshire East Groundwater enhancement	7.5	Yes	Yes
LNE12	LNE12	Surface water enhancement	Increase Lincolnshire East WTW utilisation	5	Yes	Yes

1.4 Suffolk East WRZ

1.4.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
11a603A	SUE5	Desalination	Felixstowe desalination (seawater)	25	Yes	Yes
11a603B	SUE6	Desalination	Felixstowe desalination (seawater)	50	Yes	Yes
11a603C	SUE7	Desalination	Felixstowe desalination (seawater)	100	Yes	Yes
03a0578A	SUE3	Water Reuse	Ipswich Cliff Quay to Alton via River Gipping (with additional treatment at Alton)	11.5	Yes	Yes
RW201A	SUE1	Water Reuse	Ipswich Cliff Quay direct to Alton Reservoir (with additional abstraction and treatment at Alton)	14.5	Yes	Yes
08a1094	SUE17	Aquifer recharge/Aquifer storage recovery	Bucklesham ASR	2.3	Yes	Yes
SUE23	SUE23	Groundwater enhancement	Suffolk East Groundwater	1.7	Yes	Yes

1.4.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW128SPAr	BCTTW_128_SPA_REV	Essex Central South	Suffolk East	10
BCTTW127	BCTTW_127	Suffolk West Cambs	Suffolk East	10
BCTTW159	BCTTW_159	Blyth	Suffolk East	10
SUE10	BCTTW_159	Blyth	Suffolk East	20
SUE1	BCTTW_159	Blyth	Suffolk East	50
SUE2	BCTTW_159	Blyth	Suffolk East	100
SUE3	BCTTW_159	Blyth	Suffolk East	200
SUE11	BCTTW_128_SPA_REV	Essex Central South	Suffolk East	20
SUE4	BCTTW_128_SPA_REV	Essex Central South	Suffolk East	50
SUE5	BCTTW_128_SPA_REV	Essex Central South	Suffolk East	100
SUE6	BCTTW_128_SPA_REV	Essex Central South	Suffolk East	200
SUE7	BCTTW_127	Suffolk West Cambs	Suffolk East	50
SUE8	BCTTW_127	Suffolk West Cambs	Suffolk East	100
SUE9	BCTTW_127	Suffolk West Cambs	Suffolk East	200

1.5 Ruthamford North WRZ

1.5.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
RW203A	RTN1	Water Reuse	Peterborough Flag Fen to direct to Rutland Water / Wing WTW – with extra treatment at Wing WTW	7.4	Yes	Yes
LINC25	RTN26	New Reservoir	Lincolnshire Reservoir	105	Yes	Yes
LINC50	RTN17	New Reservoir	Lincolnshire Reservoir	169	Yes	Yes
LINC75	RTN27	New Reservoir	Lincolnshire Reservoir	195	Yes	Yes
LINC100	RTN28	New Reservoir	Lincolnshire Reservoir	214	Yes	Yes

1.5.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW136r	BCTTW_136_REV	Ruthamford South	Ruthamford North	10
BCTTW124r	BCTTW_124_REV	Fenland	Ruthamford North	10
02a122024	02a_1220_24	Lincolnshire West Notts	Ruthamford North	10
02b1004	RTN21	Lincolnshire West Notts	Ruthamford North	16.9
RTN1	BCTTW_136_REV	Ruthamford South	Ruthamford North	50
RTN2	BCTTW_136_REV	Ruthamford South	Ruthamford North	100
RTN3	BCTTW_136_REV	Ruthamford South	Ruthamford North	200
RTN4	BCTTW_124_REV	Fenland	Ruthamford North	50
RTN5	BCTTW_124_REV	Fenland	Ruthamford North	100
RTN6	BCTTW_124_REV	Fenland	Ruthamford North	200
RTN7	02a_1220_24	Lincolnshire West Notts	Ruthamford North	50
RTN8	02a_1220_24	Lincolnshire West Notts	Ruthamford North	100
RTN9	02a_1220_24	Lincolnshire West Notts	Ruthamford North	200

1.6 Fenland WRZ

1.6.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
03a0332A	FND3	Water Reuse	Kings Lynn and West Walton to Stoke Ferry WTW via the River Wissey - with additional treatment at Stoke Ferry	17.4	Yes	Yes
RW220Ab	FND1	Water Reuse	Kings Lynn to Stoke Ferry via river Wissey (extra treatment	10.3	Yes	Yes

			at Stoke Ferry WTW)			
FEN25	FND23	New Reservoir	Fens reservoir	66.1	Yes	Yes
FEN50	FND21	New Reservoir	Fens reservoir	88.8	Yes	Yes
FEN75	FND24	New Reservoir	Fens reservoir	111.1	Yes	Yes
FEN100	FND25	New Reservoir	Fens reservoir	130.5	Yes	Yes
FND13	BCTTW-175	New surface water	Marham abstraction relocation	7.9	Yes	Yes

1.6.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW59REV	BCTTW_59.REV	Norfolk	Fenland	20
BCTTW139r	BCTTW_139_REV	Cambridge	Fenland	10
BCTTW124	BCTTW_124	Ruthamford North	Fenland	10
BCTTW125r	BCTTW_125_REV	Suffolk West Cambs	Fenland	10
FND1	BCTTW_59.REV	Norfolk	Fenland	50
FND2	BCTTW_59.REV	Norfolk	Fenland	100
FND3	BCTTW_59.REV	Norfolk	Fenland	200
FND4	BCTTW_139_REV	Cambridge	Fenland	50
FND5	BCTTW_139_REV	Cambridge	Fenland	100
FND12	BCTTW_139_REV	Cambridge	Fenland	200
FND6	BCTTW_124	Ruthamford North	Fenland	50
FND7	BCTTW_124	Ruthamford North	Fenland	100
FND8	BCTTW_124	Ruthamford North	Fenland	200
FND9	BCTTW_125_REV	Suffolk West Cambs	Fenland	50
FND10	BCTTW_125_REV	Suffolk West Cambs	Fenland	100
FND11	BCTTW_125_REV	Suffolk West Cambs	Fenland	20

1.7 Brett WRZ

1.7.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
RESWRZ81331	AFF-RES-WRZ8-1331	New Reservoir	Holland Brook Res	0	Yes	No

1.7.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW130	BCTTW_130	Essex Central South	Brett	0
AFB1	BCTTW_130	Essex Central South	Brett	0
AFB2	BCTTW_130	Essex Central South	Brett	0
AFB3	BCTTW_130	Essex Central South	Brett	0

1.8 Cambridge WRZ

1.8.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
CW2401A	CW24-01A	Water Reuse	Combined Ouse gravel sources Fenstanton to St Ives	0.44	Yes	Yes
CW2401B	CW24-01B	Water Reuse	Combined Ouse gravel sources Fenstanton to St Ives	2	Yes	Yes
CW2437Ai	CW24-37Ai	Water Reuse	Site scale greywater reuse Northstowe with larger storage	0.9	Yes	Yes
CW2437Aii	CW24-37Aii	Water Reuse	Site scale greywater reuse Northstowe with smaller storage	0.5	Yes	Yes
CW2438A	CW24-38A	Water Reuse	Site scale rainwater harvesting Northstowe with larger storage	0.9	Yes	Yes
CW2438B	CW24-38B	Water Reuse	Site scale rainwater harvesting Northstowe with smaller storage	0.5	Yes	Yes

CW2471	CW24-71	Water Reuse	AWS Milton WWTW effluent discharge reuse	7	Yes	Yes
CW2457	CW24-57	New surface water	River Cam abstraction and treatment works	7	Yes	Yes

1.8.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW140r	BCTTW_140_REV	Suffolk West Cambs	Cambridge	10
CAM10	BCTTW_138	Ruthamford South	Cambridge	0
CAM11	BCTTW_138	Ruthamford South	Cambridge	26
CAM12	BCTTW_139	Fenland	Cambridge	0
BCTTW138	BCTTW_138	Ruthamford South	Cambridge	10
BCTTW139	BCTTW_139	Fenland	Cambridge	10
CAM1	BCTTW_140_REV	Suffolk West Cambs	Cambridge	50
CAM2	BCTTW_140_REV	Suffolk West Cambs	Cambridge	100
CAM3	BCTTW_140_REV	Suffolk West Cambs	Cambridge	200
CAM4	BCTTW_138	Ruthamford South	Cambridge	50
CAM5	BCTTW_138	Ruthamford South	Cambridge	100
CAM6	BCTTW_138	Ruthamford South	Cambridge	200
CAM7	BCTTW_139	Fenland	Cambridge	50
CAM8	BCTTW_139	Fenland	Cambridge	100
CAM9	BCTTW_139	Fenland	Cambridge	200

1.9 Essex WRZ

1.9.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
ESWDES1ESWUIDDES21AWSUIDA	ESW-DES-001D	Desalination	Canvey Island Terrestrial	25	Yes	Yes
ESWDES1ESWUIDDES21AWSUIDB	ESW-DES-001E	Desalination	Canvey Island Terrestrial	50	Yes	Yes
ESWDES1ESWUIDDES21AWSUIDC	ESW-DES-001H	Desalination	Canvey Island Terrestrial	100	Yes	Yes
ESWDES001D	ESW-DES-001I	Desalination	Canvey Island Terrestrial	190	Yes	Yes
ESWEFR3	ESW-EFR-003	Water Reuse	Colchester Effluent Re use to Aberton Reservoir	15.2	Yes	Yes
ESWEFR001AESWUID03b0659AAWSUID	ESW-EFR-001	Water Reuse	Southend Effluent reuse to Hanningfield Reservoir	44	Yes	Yes
ESWABS00235	ESW-ABS-002	Groundwater enhancement	Linford New WTW	3.5	Yes	Yes
ESWABS0027	ESW-ABS-002	Groundwater enhancement	Linford New WTW	10	Yes	Yes

1.9.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
ESWTRA009	ESW-TRA-009	Essex Central South	Essex	10
ESW4	ESW-TRA-009	Essex Central South	Essex	20
ESW1	ESW-TRA-009	Essex Central South	Essex	50
ESW2	ESW-TRA-009	Essex Central South	Essex	100
ESW3	ESW-TRA-009	Essex Central South	Essex	200

1.10 Essex Central South WRZ

1.10.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
DES16A	EXS10	Desalination	Holland on Sea desalination	25	Yes	Yes
DES16B	EXS11	Desalination	Holland on Sea desalination	50	Yes	Yes
DES16C	EXS12	Desalination	Holland on Sea desalination	100	Yes	Yes
RW219B	EXS2	Water Reuse	Colchester Effluent reuse direct to Ardleigh Reservoir	16.8	Yes	Yes
RW217B	EXS4	Water Reuse	Clacton-Holland Haven to Ardleigh Reservoir (no additional treatment at Ardleigh)	5.7	Yes	Yes

1.10.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
EXS18		Suffolk West Cambs	Essex Central South	10
BCTTW128SPA	BCTTW_128_SPA	Suffolk East	Essex Central South	10
ESWTRA009r	ESW-TRA-009-REV	Essex	Essex Central South	10
BCTTW130r	BCTTW_130_REV	Brett	Essex Central South	0
ESWTRA004r	ESW-TRA-004-REV	Hartismere	Essex Central South	7.5
EXS14	BCTTW_128_SPA	Suffolk East	Essex Central South	20
EXS1	BCTTW_128_SPA	Suffolk East	Essex Central South	50
EXS2	BCTTW_128_SPA	Suffolk East	Essex Central South	100
EXS3	BCTTW_128_SPA	Suffolk East	Essex Central South	200

EXS15	ESW-TRA-009-REV	Essex	Essex Central South	20
EXS4	ESW-TRA-009-REV	Essex	Essex Central South	50
EXS5	ESW-TRA-009-REV	Essex	Essex Central South	100
EXS6	ESW-TRA-009-REV	Essex	Essex Central South	200
EXS7	BCTTW_130_REV	Brett	Essex Central South	0
EXS8	BCTTW_130_REV	Brett	Essex Central South	0
EXS9	BCTTW_130_REV	Brett	Essex Central South	0
EXS13	ESW-TRA-004-REV	Hartismere	Essex Central South	20
EXS10	ESW-TRA-004-REV	Hartismere	Essex Central South	50
EXS11	ESW-TRA-004-REV	Hartismere	Essex Central South	100
EXS12	ESW-TRA-004-REV	Hartismere	Essex Central South	200

1.11 Hartismere WRZ

1.11.1 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
ESWTRA015	ESW-TRA-015	Northern Central	Hartismere	7.5
ESWTRA004	ESW-TRA-004	Essex Central South	Hartismere	7.5
ESWTRA011	ESW-TRA-011	Blyth	Hartismere	10
ESWTRA016	ESW-TRA-016	Norfolk	Hartismere	5
HAR14	ESW-TRA-015	Northern Central	Hartismere	20
HAR10	ESW-TRA-015	Northern Central	Hartismere	50
HAR11	ESW-TRA-015	Northern Central	Hartismere	100
HAR12	ESW-TRA-015	Northern Central	Hartismere	200
HAR15	ESW-TRA-004	Essex Central South	Hartismere	20
HAR1	ESW-TRA-004	Essex Central South	Hartismere	50
HAR2	ESW-TRA-004	Essex Central South	Hartismere	100

HAR3	ESW-TRA-004	Essex Central South	Hartismere	200
HAR13	ESW-TRA-011	Blyth	Hartismere	20
HAR4	ESW-TRA-011	Blyth	Hartismere	50
HAR5	ESW-TRA-011	Blyth	Hartismere	100
HAR6	ESW-TRA-011	Blyth	Hartismere	200
HAR16	ESW-TRA-016	Norfolk	Hartismere	20
HAR7	ESW-TRA-016	Norfolk	Hartismere	50
HAR8	ESW-TRA-016	Norfolk	Hartismere	100
HAR9	ESW-TRA-016	Norfolk	Hartismere	200

1.12 Norfolk WRZ

1.12.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
11a452A	NTB17	Desalination	Bacton desalination (seawater)	25	Yes	Yes
11a452B	NTB18	Desalination	Bacton desalination (seawater)	50	Yes	Yes
11a452C	NTB19	Desalination	Bacton desalination (seawater)	100	Yes	Yes
03a476	NTB1	Water Reuse	Lowestoft to Norwich Reuse	11.1	Yes	Yes
rw222	NTB27	Water Reuse	Caister Lowestoft Effluent Reuse to Norwich	27.5	Yes	Yes
03b478	NTB27	Water Reuse	Caister Pump Lane Effluent Reuse to Norwich	16.4	Yes	Yes
NFK18	NTB29	Water Reuse	Whitlingham Trowse reuse	21.7	Yes	Yes

1.12.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW59FWD	BCTTW_59.FWD	Fenland	Norfolk	20
ESWTRA007r	ESW-TRA-007-REV	Northern Central	Norfolk	10
NFK1	BCTTW_59.FWD	Fenland	Norfolk	50
NFK2	BCTTW_59.FWD	Fenland	Norfolk	100
NFK3	BCTTW_59.FWD	Fenland	Norfolk	200
ESWTRA016	ESW-TRA-016-REV	Hartismere	Norfolk	5
HAR16	ESW-TRA-016-REV	Hartismere	Norfolk	20
HAR7	ESW-TRA-016-REV	Hartismere	Norfolk	50
HAR8	ESW-TRA-016-REV	Hartismere	Norfolk	100
HAR9	ESW-TRA-016-REV	Hartismere	Norfolk	200
NFK17	ESW-TRA-007-REV	Northern Central	Norfolk	20
NFK10	ESW-TRA-007-REV	Northern Central	Norfolk	50
NFK11	ESW-TRA-007-REV	Northern Central	Norfolk	100
NFK12	ESW-TRA-007-REV	Northern Central	Norfolk	200

1.13 Northern Central WRZ

1.13.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
DES7A	NTB5	Desalination	Great Yarmouth Conjunctive Terrestrial	25	Yes	Yes
DES7B	NTB4	Desalination	Great Yarmouth Conjunctive Terrestrial	50	Yes	Yes
DES50A	NTB20	Desalination	Caister Terrestrial	25	Yes	Yes
DES50B	NTB21	Desalination	Caister Terrestrial	50	Yes	Yes
DES50C	NTB22	Desalination	Caister Terrestrial	100	Yes	Yes

ESWEFR2 OldAWID RW202	ESW-EFR-002A-TRA	Water Reuse	Lowestoft to Ellingham Mill for Barsham WTW	11.1	Yes	Yes
ESWRES002A	ESW-RES-002A	New Reservoir	North Suffolk Winter Storage Reservoir	16.2	Yes	Yes
ESWRES002B	ESW-RES-002B	New Reservoir	North Suffolk Winter Storage Reservoir	18.5	Yes	Yes
ESWRES002C	ESW-RES-002C	New Reservoir	North Suffolk Winter Storage Reservoir	19.9	Yes	Yes

1.13.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
ESWTRA014	ESW-TRA-014	Hartismere	Northern Central	7.5
ESWTRA013	ESW-TRA-013	Blyth	Northern Central	10
ESWTRA007	ESW-TRA-007	Norfolk	Northern Central	10
NC11	ESW-TRA-014	Hartismere	Northern Central	20
NCL1	ESW-TRA-014	Hartismere	Northern Central	50
NCL2	ESW-TRA-014	Hartismere	Northern Central	100
NCL3	ESW-TRA-014	Hartismere	Northern Central	200
NCL10	ESW-TRA-013	Blyth	Northern Central	20
NCL4	ESW-TRA-013	Blyth	Northern Central	50
NCL5	ESW-TRA-013	Blyth	Northern Central	100
NCL6	ESW-TRA-013	Blyth	Northern Central	200
LNC12	ESW-TRA-007	Norfolk	Northern Central	20

NCL7	ESW-TRA-007	Norfolk	Northern Central	50
NCL8	ESW-TRA-007	Norfolk	Northern Central	100
NCL9	ESW-TRA-007	Norfolk	Northern Central	200

1.14 Ruthamford South

1.14.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
RTS21	RTS21	Surface water enhancement	Clapham WTW surface water enhancement	7.8	Yes	Yes
RTS22	RTS22	Surface water enhancement	Clapham WTW Surface water expansion	9.4	Yes	Yes
RTS16	RTS16	Drought permits/orders	RTS drought permit	2.2	Yes	Yes

1.14.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW138r	BCTTW_138_REV	Cambridge	Ruthamford South	10
BCTTW136	BCTTW_136	Ruthamford North	Ruthamford South	10
RTS1	BCTTW_138_REV	Cambridge	Ruthamford South	50
RTS2	BCTTW_138_REV	Cambridge	Ruthamford South	100
RTS3	BCTTW_138_REV	Cambridge	Ruthamford South	200
RTS4	BCTTW_136	Ruthamford North	Ruthamford South	50
RTS5	BCTTW_136	Ruthamford North	Ruthamford South	100
RTS6	BCTTW_136	Ruthamford North	Ruthamford South	200

1.15 Suffolk West Cambs WRZ

1.15.1 Constrained options

WRE Option ID	Water company ID	Option type	Option name	Water available for use (Ml/d)	Feasible	Taken through to modelling
SWC9GW	SWC13	New groundwater	Little Bradley groundwater abstraction and treatment	2.6	Yes	Yes

1.15.2 Transfer options

WRE Option ID	Route ID	From (WRZ)	To (WRZ)	Water available for use (Ml/d)
BCTTW127r	BCTTW_127_REV	Suffolk East	Suffolk West Cambs	10
BCTTW140	BCTTW_140	Cambridge	Suffolk West Cambs	10
BCTTW125	BCTTW_125	Fenland	Suffolk West Cambs	10
SWC1	BCTTW_127_REV	Suffolk East	Suffolk West Cambs	50
SWC2	BCTTW_127_REV	Suffolk East	Suffolk West Cambs	100
SWC3	BCTTW_127_REV	Suffolk East	Suffolk West Cambs	200
SWC10	BCTTW_138 and BCTTW140	Ruthamford South	Suffolk West Cambs	50
SWC4	BCTTW_140	Cambridge	Suffolk West Cambs	50
SWC5	BCTTW_140	Cambridge	Suffolk West Cambs	100
SWC6	BCTTW_140	Cambridge	Suffolk West Cambs	200
SWC7	BCTTW_125	Fenland	Suffolk West Cambs	50
SWC8	BCTTW_125	Fenland	Suffolk West Cambs	100
SWC9	BCTTW_125	Fenland	Suffolk West Cambs	200

Annex B: Rejection register

WRE Option ID	Option name	Option type	Rejection reason
DES44A	Trent river Brackish 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES44B	Trent river Brackish 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
ESWDES2 ESWUIDD ES20AWS UIDA	Tilbury Brackish 25	Desalination	Land is expected to be limited and expensive to secure due to development within the Tilbury rea. The location would also require significant infrastructure to connect to the main network
ESWDES2 ESWUIDD ES20AWS UIDB	Tilbury Brackish 50	Desalination	Land is expected to be limited and expensive to secure due to development within the Tilbury rea. The location would also require significant infrastructure to connect to the main network
ESWDES2 ESWUIDD ES20AWS UIDC	Tilbury Brackish 100	Desalination	Land is expected to be limited and expensive to secure due to development within the Tilbury rea. The location would also require significant infrastructure to connect to the main network
ESWDES2 ESWUIDD ES20AWS UIDD	Tilbury Brackish 125	Desalination	Land is expected to be limited and expensive to secure due to development within the Tilbury rea. The location would also require significant infrastructure to connect to the main network
ESWDES2 ESWUIDD ES20AWS UIDE	Tilbury Brackish 145	Desalination	Land is expected to be limited and expensive to secure due to development within the Tilbury rea. The location would also require significant infrastructure to connect to the main network
ESWDES0 07	Tilbury Brackish Barge	Desalination	Land is expected to be limited and expensive to secure due to development within the Tilbury rea. The location would also require significant infrastructure to connect to the main network
DES11SH BA	LNE COP Terrestrial 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.

WRE Option ID	Option name	Option type	Rejection reason
DES11SHBB	LNE COP Terrestrial 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES11SHBC	LNE COP Terrestrial 50	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES11A	LNE Terrestrial 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES11B	LNE Terrestrial 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES11C	LNE Terrestrial 50	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES34A	Orwell 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES34B	Orwell 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES26A	Mablethorpe desalination with transfer to Etton 25	Desalination	Excessively long and difficult to deliver transfer.
DES26B	Mablethorpe desalination with transfer to Etton 50	Desalination	Excessively long and difficult to deliver transfer.
DES26C	Mablethorpe desalination with transfer to Etton 100	Desalination	Excessively long and difficult to deliver transfer.
11a372CONA	Kings Lynn Brackish with preferential power 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
11a372CONB	Kings Lynn Brackish with preferential power 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
11a372A	Kings Lynn Brackish Desalination 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
11a372B	Kings Lynn Brackish Desalination 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.

WRE Option ID	Option name	Option type	Rejection reason
DES08f	Great Yarmouth Offshore	Desalination	Offshore option offers no benefit over onshore option but carries additional risk
DES12b	Felixstowe Offshore	Desalination	Offshore option offers no benefit over onshore option but carries additional risk
ESWDES006	Canvey Island Desalination Barge	Desalination	Offshore option offers no benefit over onshore option but carries additional risk
DES54	Caister Offshore	Desalination	Offshore option offers no benefit over onshore option but carries additional risk
DES38A	Boston area Brackish 10	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
DES38B	Boston area Brackish 25	Desalination	Unmitigatable risks associated with brackish and estuarial desalination options.
CON3a	CON 3a 5MLD Little Barford WTW	Conjunctive use	Complex environmental and water quality issues. Very small WAFU benefit relative to cost.
F010264	Foxcote	New surface water	Very small WAFU benefit relative to cost.
CW1013CW16X	Streatham Reservoir	New reservoir	Alternative to Fens reservoir - rejected as Fens has been taken forward.
CW1415X	St Ives Reservoir	New reservoir	Alternative to Fens reservoir - rejected as Fens has been taken forward.
CW17X	Brandon Bank Reservoir	New reservoir	Alternative to Fens reservoir - rejected as Fens has been taken forward.
CW18X	Feltwell Anchor Reservoir	New reservoir	Alternative to Fens reservoir - rejected as Fens has been taken forward.
CW19X	10 Mile Bank Reservoir	New reservoir	Alternative to Fens reservoir - rejected as Fens has been taken forward.