WRMP24 Options Appraisal

Main report and Annexes

August 2023

Wessex Water
YTL GROUP

Document revisions

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Contents

1. Introduction

This report sets out our approach to Options Appraisal for our draft Water Resources Management Plan (WRMP24). It shows how we followed an approach consistent with the Water Resources Planning Guideline (WRPG)[1], the Water Resources Direction[2] and government expectations[3] and other documents, such as Ofwat's expectations on smart networks[4].

It sets out how we have used appropriate methods all the way through this process to ensure that our plan is legally compliant and provides value for money to customers. In particular it shows how we have complied with the requirements of the Water Industry Act 1991, sections 37A to 37D and any secondary legislation made. This includes the Water Resources Management Plan Regulations 2007 and the ministerial directions given under this legislation.

1.1 Overall approach

We carried out a thorough options appraisal for our WRMP24 and considered a number of options to increase supply and reduce demand across our water supply area, including options to reduce both leakage and consumption. We also considered transfers that would allow water to be conveyed from neighbouring water companies and within our supply area. This included an evaluation of a range of third-party options including engagement with regional water resource groups and neighbouring water companies.

The overall options appraisal process was based on the planning stages described by the Environment Agency's planning guidelines. Figure 1-1 describes the four key stages which are summarised in the bullet points below.

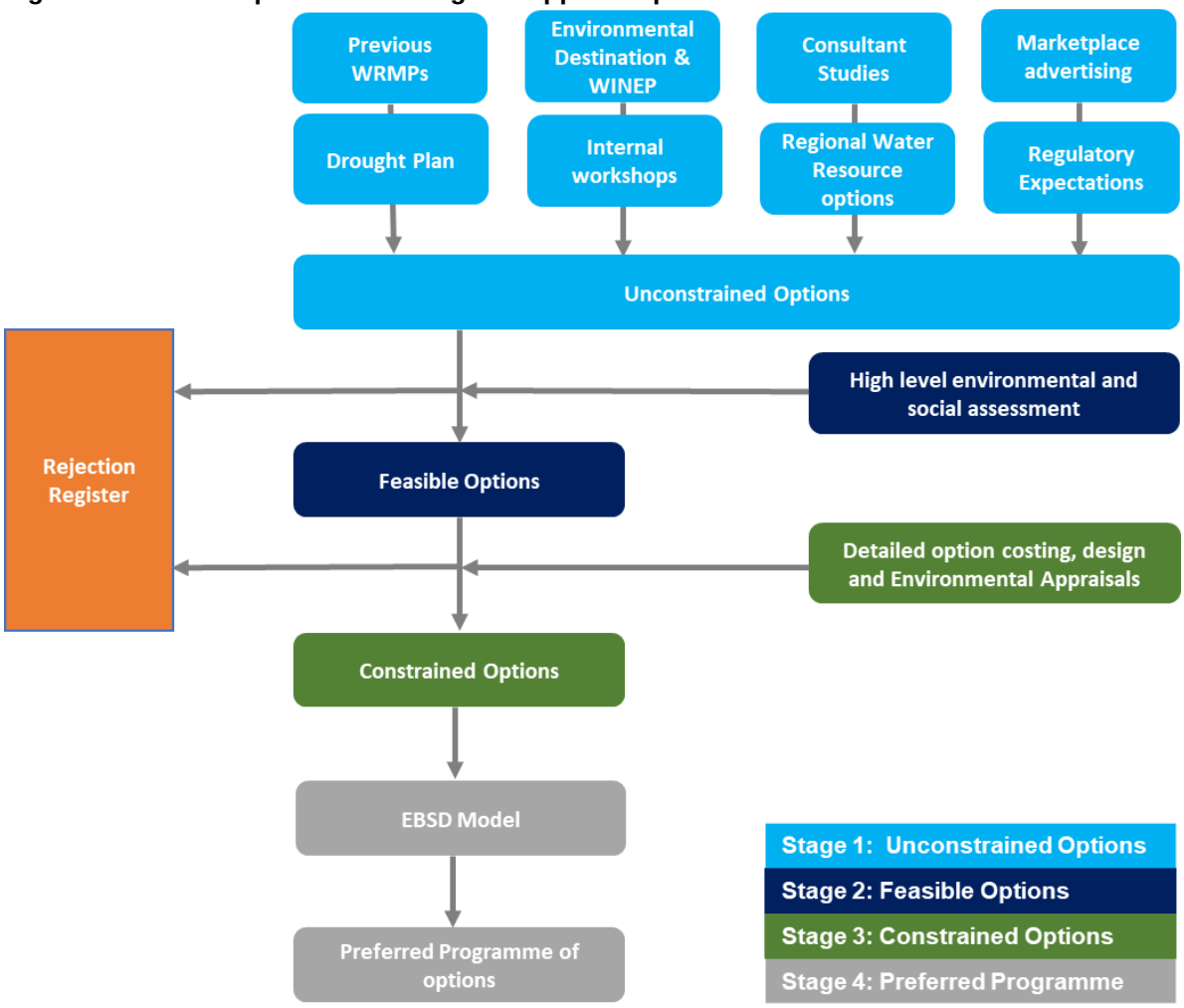
- Stage 1: Development of the Unconstrained Options list.
- Stage 2: Screening of the Unconstrained Options to produce a list of Feasible Options.
- Stage 3: Technical review and analysis of the Feasible Options, reviewing the risks and benefits to produce a Constrained Option list (including the environmental and social assessment metrics).
- Stage 4: Constrained Options and environmental and social metrics are inputted into the EBSD model to generate a preferred programme per scenario which is then reviewed as part of the options appraisal process.

The first three stages are described in this report. At the end of Stage 3 we had developed key information for each of the constrained options, including their costs, environmental impacts and benefits which then were used in the EBSD model to generate a programme of

[1] Environment Agency (Feb 2021). Water Resources Planning Guidelines
[2] The Water Resources Management Plan (England) Direction 2022, 28 April 2022
[3] Government expectations for water resources planning, 28 April 2022
[4] https://www.ofwat.gov.uk/publication/pr24-and-beyond-long-term-delivery-strategies-and-common-reference-scenarios/

options. Stage four is described in the Technical Appendix on Decision Making and Uncertainty.

Figure 1-1: WRMP options screening and appraisal process



Our options appraisal process identified options at varying scales, from ideas that would assist localised areas of water stress, through to Strategic Resource Options (SROs) which would be promoted in conjunction with our neighbouring companies within the West Country Water Resources Group (WCWRG). We have also liaised with other water companies at a national scale[5] to recognise any opportunities which would be mutually beneficial to other regions. Options were also identified to meet the requirements of the Direction and expectations set out by government, including reductions in leakage and consumption.

The level of detail in the options appraisal increases from Stage 1 to 4. Initially the screening was undertaken at a high level in Stage 1, looking at criteria such as initial feasibility from a technical and environmental perspective to carrying out Strategic Environmental Assessments (SEAs) and cost profiling in Stage 3, and then using that information to develop different possible programmes of options in Stage 4.

[5] Environment Agency (March 2020). Meeting our future water needs: a national framework for water resources

1.2 Overview to approach

1.2.1 Stage 1 – Development of Unconstrained Options list

Our Unconstrained Options list was developed by reviewing options from previous WRMPs and creating new options through workshops with internal stakeholders within Wessex Water. We also advertised externally for third-party options (via our Marketplace website) and liaised with neighbouring water companies about SROs and bulk transfers between companies. We worked with the WCWRG to ensure work was consistent with the work being undertaken by other companies in the region. Over 360 options were identified in our initial unconstrained list.

1.2.2 Stage 2 – Screening of Unconstrained Options to produce a list of Feasible Options

Once collated, the Unconstrained Options were evaluated against screening criteria in order to produce a list of Feasible Options. The screening at this stage was relatively high level, and internal review meetings were held to ensure that the feasible list would provide enough choice to meet the supply demand planning requirements (in terms of yield, lead time and geographical locations), as well as offering a range of option types across customer, distribution, production and resource categories. Where there were options that were exclusive of each other (for instance where two reservoir sites had been identified on a river but the flows in the river meant that only one could be constructed) we assessed which was the best option to include in the feasible options list.

1.2.3 Stage 3 – Technical review and analysis of Feasible Options

Stage 3 involved scoping and design of the feasible options. For instance, for reservoir options, we identified the approximate location, requirements for the embankment and routes for the pipelines. For leakage and demand management options, we developed a range of scenarios to reduce leakage and consumption using a mix of different metering technologies, leakage techniques, water efficiency projects and assumptions about government labelling of appliances.

For each of the demand management and leakage scenarios, costs were developed along with estimates of the savings for each scenario. We used a combination of our own data and data provided by suppliers to determine the costs of each scenario. In total, 16 demand scenarios were developed to reduce consumption and seven leakage scenarios were developed to reduce leakage.

For each supply option we developed initial designs, which usually included an assessment of the assets required for the abstraction, treatment, storage, and distribution of water.

Our teams of environmental experts, engineers, cost experts and carbon experts worked together to ensure that there was consistency throughout the process. Once each supply, leakage or demand option was designed, assessments were undertaken to determine the capital and operational costs of each option as well as carbon and environmental impacts. This ensured we were compliant with key legislation associated with SEA, Habitat Regulation Assessments (HRA) and the Water Framework Directive (WFD).

1.2.4 Stage 4 – EBSD modelling to produce the Preferred Programme and alternatives

Once assessment of each feasible supply and demand scenario had been completed, we used our EBSD modelling tool to produce a Preferred Programme of options to maintain a supply-demand surplus over the planning period. This is detailed in the Decision Making and Uncertainty technical report.

1.2.5 Structure of this report

This report is structured in the following way:

- Section 2: Unconstrained Options to Feasible Options list (Stage 1 and 2)
- Section 3: Feasible Option Assessments including option design, costing and environmental assessment (Stage 3)
- Section 4 leads into the Supply Demand Balance, Decision-Making and Uncertainty technical appendix.

There are a number of appendices with more detail and a list of references.

2. Stage 1: Unconstrained Options List Development

The first stage of our options appraisal process was to produce an initial list of unconstrained options that could be implemented to maintain a supply-demand balance and meet reductions in PCC and leakage. The Environment Agency guidance[1] states that the following inputs should be used to generate this initial list of unconstrained options:

- Previous Wessex Water WRMP options lists, and updates where necessary
- Workshops with internal stakeholders and colleagues to identify new options
- Meetings with external stakeholders and regional groups
- Advertising for third-party assistance.

At this stage, no screening criteria were applied, which generated a large list of options. Each option was categorised into one of the four categories below[6], with a more detailed breakdown in listing the types of options associated within each category described in Table 2-1:

- Customer management
- Distribution management
- Production management
- Resource management

Table 2-1: Option categories and types

Customer management	Distribution management	Production management	Resource management
Metering – change of occupancy	Active leakage management	Outage reduction	New groundwater sources
Metering – compulsory	Pressure management	Water treatment works capacity increases	New reservoir sources
Metering – optants	Mains replacement	Water treatment works loss recovery	Expansion of reservoirs
Household water audits	Trunk mains renewal	Nitrate treatment	Licence utilisation
Household water recycling	Network upgrades		Water recycling
Rainwater harvesting	External potable transfers		Desalination
Retrofitting indoor efficiency devices	Internal potable transfers		External raw transfers
Water efficiency education & awareness			Drought permits/orders
Tariff changes			Licence trading
Changes in service levels & usage bans			Aquifer storage and recovery

[6] UKWIR (2012). Water Resources Planning Tools 2012: Summary Report.

2.1 Unconstrained Options Data Sources

2.1.1 Water Resource Management Plan reviews

The starting point for collating our unconstrained options was reviewing our previous WRMP options lists (including those from WRMP14[7] and WRMP19[8]). The details behind these options were revised and updated, as our water supply network has evolved substantially in recent years. There have also been changes to the technology available within the industry, which may have impacted the suitability of previous options.

In addition to these areas, the Water Industry National Environment Programme (WINEP) and Environmental Destination Programme have highlighted locations within our water supply area where previously feasible options would no longer be viable, due to the likelihood of abstraction licences being reduced in future years. Despite these changes, we took an inclusive approach, with most of the options from previous WRMP planning rounds were added to the unconstrained list, where they could then be screened for feasibility in Stage 2 of the options appraisal process.

2.1.2 Internal workshops

Alongside the review of previous WRMP options, internal workshops and meetings were scheduled with colleagues from Operations (Production, Networks, Science and Supply Strategy) to assess how our existing assets, sites and supply network could be improved or adjusted to increase the available supply to parts of our network.

The options discussed included production site improvements to help reduce outages or increase capacity, as well as distribution system improvements to increase flexibility within the network by upgrading intra-zonal transfers through making them bi-directional or increasing their transfer capacity.

Other internal workshops and meetings led by our Environment Team were used to identify current licences which could be up for review, or possibly reduced, both from WINEP investigations and the Environment Agency's National Framework on Environmental Destination. Any new options identified in the internal workshops and meetings were added to the unconstrained options list. A summary of the workshops and meetings held is provided in Annex A.

2.1.3 Commissioned Studies - supply options

In addition to the internal workshops, work was undertaken with external consultants to expand upon the previous WRMP reservoir storage options and identify new locations that could be developed into reservoirs for increased winter storage, both within and outside of our supply network area[9]. The initial list of locations was developed using GIS analysis to highlight upland impounding reservoir sites, and lowland bunded reservoir sites. The long list was then screened using further GIS analysis, which left a shorter list of reservoir options to be included in our unconstrained options list.

[7] Wessex Water (July 2014). Water Resources Management Plan
[8] Wessex Water (Aug 2019). Water Resources Management Plan
[9] Wood (June 2021). Wessex Water: Strategic Storage Options.

New, large scale water resource options such as water recycling and desalination plants were also assessed by consultants (Stantec)[10], as well as reservoir enlargements which could benefit the whole region. Some of these options include new transmission systems to enable linking of the supply networks between companies. There is a large degree of complexity to these options as the planning needs to consider the water resource needs of three companies, as well as the environmental implications across several areas.

2.1.4 Regional Water Resources and Strategic Resource Options

SROs were explored to identify large scale water resource projects which could increase our available supply. As a member of the WCWRG, we have collaborated with South West Water and Bristol Water to identify options that would provide benefits for the whole South West region, as well as in the Water Resources South East (WRSE) area. There are already several transfers of potable supply between Wessex Water, Bristol Water and South West Water's supply area around Bournemouth, as well as shared resources, such a reservoir in Exmoor.

SRO evaluation considered new raw and potable bulk transfers, as well as the two options currently going through the gated process as part of RAPID (Regulators' Alliance for Progressing Infrastructure Development) programme. These options are Mendips Quarry reservoirs[11] and Poole water recycling[12], both of which could see mutual benefits to Wessex Water and South West Water, depending upon company supply-demand requirements.

Exploration of further options, or enhancing the transfers already in place, could in theory aid other water companies towards the East of England and along the South Coast, as part of the EA National Framework[13]. This national scale of planning is being developed with numerous companies, with possible options consisting of raw water transfers via rivers and canals across large distances of Wales and England.

During the development of our WRMP we have met with neighbouring companies to ensure that our work is consistent with regional needs. Cost data, carbon and environmental assessments for each SRO were later used in our options appraisal to generate our preferred plan. We ensured that for shared schemes, the costs were appropriately allocated between companies.

[10] Stantec (October 2021). Regional Wastewater Reuse Options.
[11] South West Water and Wessex Water (December 2021). Strategic Regional Water Resource Solutions: Gate one submission for Mendip quarries – new solution
[12] Stantec (July 2021). Strategic Regional Water Resource Solutions: Preliminary Feasibility Assessment. Standard Gate One Submission for West Country South – Sources and Transfers.
[13]Environment Agency (March 2020). Meeting our future water needs: a national framework for water resources

2.1.5 Commissioned Studies - demand reduction options

Consultants also investigated the feasibility of customer side options deployed across the whole region[14] and leakage reduction options[15]. Although the initial reports were aimed at identifying regional demand side options, it highlighted numerous ideas that could be adopted by companies themselves. Separate options to be considered included:

- Change of occupier metering (basic and smart metering)
- Optant metering (basic and smart)
- Compulsory metering (basic and smart)
- Water efficiency visits (both household and non-household)
- Tariff changes
- Community rainwater harvesting.

Similarly, a range of leakage options were developed by consultants Mott McDonald for WCWRG. The separate options considered at this stage included:

- Active leakage management
- Mains replacement and asset renewal
- Improved leakage detection (network metering, acoustic logging and monitoring)
- Network adjustments through pressure management and control zones
- Customer supply pipe repairs.

On the basis of this regional work, we developed an extensive list of over 130 unconstrained customer demand and leakage reduction options. As some options help both to reduce leakage and consumption (e.g. smart metering) we ensured that the work was consistent and did not double count either the costs or benefits.

The range of option types identified to reduce demand included research with customer challenge groups (CCGs) to distinguish which types of options would be favoured by household and non-household customers. This work later included options consistent with Ofwat's Long Term Delivery Strategies and Common Reference Scenarios which included smart networks to reduce leakage and consumption.

The separate options for both customer side and leakage management were then blended to create a range of scenarios. These scenarios included aspirations to meet government expectations by 2050 for per capita consumption (reducing customer demand to 110 litres per person per day) and for leakage (reducing leakage to 50% of the 2017/18 baseline), as well as scenarios which deviated from these government targets, which would have lower costs and have different carbon impacts.

We also developed scenarios which could be used as part of an adaptive plan, in line with Ofwat expectations. These scenarios included an initial roll out of smart meters in AMP8 to allow for full appraisal of the costs and benefits before committing to an ongoing rollout in

[14] Wood (April 2021). West Country WR: Demand Management WRMP24 Options
[15] Mott McDonald (September 2021), West Country Water Resources Group Leakage Framework Development

later years. The scenarios take into account that our supply area is now designated as being in an area of serious water stress, and we can, with support from customers, implement a compulsory metering programme.

Whilst we hope that the government will commit to introducing water efficiency labelling on new appliances, this is still uncertain. Therefore, our scenarios considered futures where government did introduce labelling and where they did not.

Examples of the option scenarios generated are below in Table 2-2. The full list of scenarios includes those which meet the WRPG and Ofwat's reference scenarios, as well as those that allow us to explore the costs of different demand and leakage reductions.

Table 2-2: Examples of the demand and leakage scenarios developed

Category	Option scenario	Description
Customer scenarios	Automated Meter Reading (AMR) with associated Water Efficiency Surveys on both Households and Non-Households as well as government water efficiency labelling on appliances.	Installation of smart AMR meters at 95% of households by 2050 with supplementary water efficiency visits at around 15000 properties per annum. This scenario is designed to reduce both household and non-household consumption and meet the government expectation of a reduction of demand (equal to a PCC reduction to 110 l/h/d by 2050).
	Compulsory basic metering by 2035 to be consistent with Ofwat "High Tech" reference scenario to reduce leakage and PCC with associated Water Efficiency Surveys on both Households and Non-Households as well as government water efficiency labelling on appliances.	Compulsory basic metering across whole region with water efficiency visits, however this option does not meet the government expectation of reducing PCC to 110l/h/d by 2050.
	Smart metering by 2035 + labelling	Fast roll out of smart metering to 95% of households by 2040 as part of a plan to have a smart network, consistent with Ofwat's High Tech Reference scenarios, including government labelling on appliances.
Leakage scenarios	Linear reduction to 50% by 2050	Total leakage reduction of 25.3 Ml/d achieved linearly using the least cost approach to achieve the target.
	Slow rate of reduction to 30% by 2050	Total leakage reduction of 9.96 Ml/d achieved linearly.
	Fast rate of reduction for 30% in 2030 then 50% by 2050	9.96 Ml/d reduction by 2030, then a total reduction of 25.3 Ml/d by 2050.

2.1.6 Third-party solutions

For our Unconstrained Options development, we advertised on the Wessex Water Market Place highlighting that we are expecting a supply-demand deficit in the future and are seeking third-party support. The Wessex Water Market Place is a hub for our 'open system' approach to problem solving, opening the opportunity for third parties and suppliers to engage with us.

This information was also shared with our neighbouring water companies, to allow discussions surrounding supply-demand water availability and trading opportunities throughout the WCWRG.

All bids were screened against the Bid Assessment Framework criteria, which mirrors those of our feasible options fine screening criteria (as seen in Table 2-3). There were however pre-screening checks of the third-party credentials, which are defined in the Wessex Bid Assessment Framework[16], along with a full description of the information required for each third-party bid.

Table 2-3: Criteria for bid assessment framework and Wessex fine screening

Criteria	Bid Assessment Framework Screening	Wessex Options Fine Screening
Cost	Yes	Yes
Provider credentials	Yes	No
Yield	Yes	Yes
Leadtime	Yes	Yes
Technical difficulty	Yes	Yes
Suitability	Yes	Yes
Flexibility	Yes	Yes
Security of supply	Yes	Yes
Promotability	Yes	Yes
Environmental impact	Yes	Yes
Sustainability	Yes	Yes
Provider credentials	Yes	Yes

2.1.7 Wessex Water drought plan

In line with the guidance, the drought permit options in our latest drought plan have been included within the Options Appraisal process. These options are presented in Table 2-4. The Drought Permit Options on the River Tone and Yeo have not been included as these options are still subject to regulatory approval.

[16] Wessex Water (March 2019) Water resources bid assessment framework

Table 2-4: Drought plan options included in the Options Appraisal

Drought Plan Link	Drought Plan Option
4FPD Temporary Use Ban	Temporary Use Ban
7FPD Non-Essential Use Ban	Non-Essential Use Ban
3FPD Other Level 1 Drought Measures	Leakage - Phase 1
6FPD Other Level 2 Drought Measures	Leakage - Phase 2
6FPD Other Level 2 Drought Measures	Leakage - Phase 3
3FPD Other Level 1 Drought Measures	WE - Phase 1
3FPD Other Level 1 Drought Measures	WE - Phase 2

2.2 Stage 1 outcomes overview

The outcome of the Stage 1 assessment was an Unconstrained Options list of 364 options. This total started out lower, but as stated in the guidance, developing the unconstrained options list is an iterative process. As the WINEP, Environmental Destination and supply-demand balance calculations evolved, new options were added to the list, or options were combined with others to produce greater benefits and reduce dependencies between options.

Figure 2-1 displays the total supply and demand options generated in the Unconstrained Options list, with Figure 2-2 showing the totals of different option categories. Distribution options can be split into either demand or supply options, hence why the split between supply and demand options looks different between figures. For example, within the distribution categories there are options to reduce demand (leakage options), as well as those leading to a benefit in supply (potable transfers).

Figure 2-1: Chart showing supply & demand option totals from Unconstrained Options list

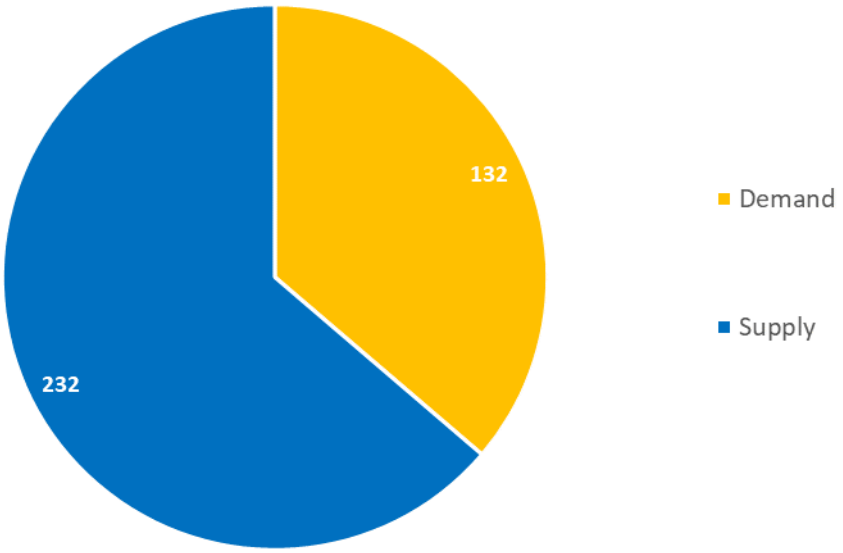
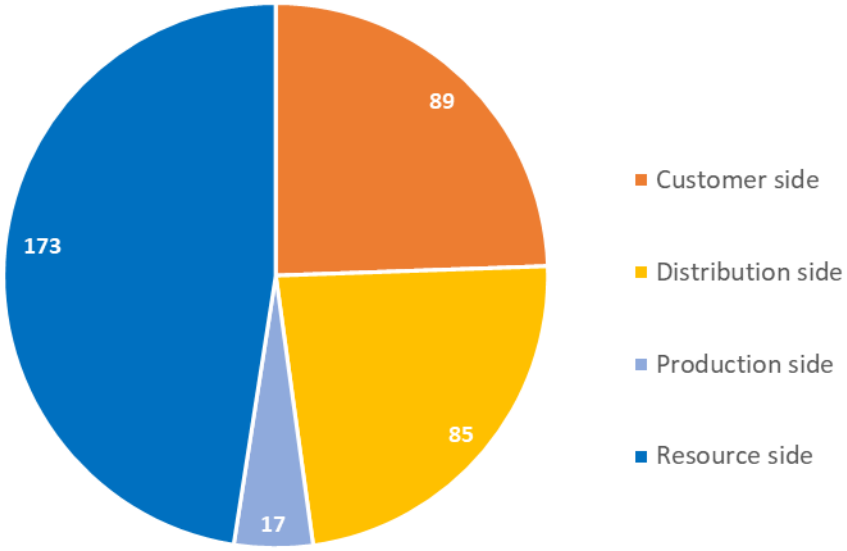


Figure 2-2: Chart showing Unconstrained Option list option category totals



3. Stage 2: Unconstrained Option Screening

3.1 Options screening criteria

Once the Unconstrained Option list was generated in Stage 1, screening of each option against a set of criteria was undertaken. The basis of our screening criteria was taken from the Environment Agency guidance[17], which states the information required for each option. The screening criteria was scored on a scale of -2 to +2, which is displayed in Table 3-1. The scoring scale is aimed at highlighting negative impacts and risks of options, as well as allowing for positive benefits to be recognised. This reflects our ambition to provide a net gain to the environment and society. Reviews of the screening criteria were held with internal stakeholders and the resulting feasible options list distributed to the Environment Agency for comment and discussion.

Table 3-1: Screening scoring scale

Criteria assessment scale	
+2	strong positive benefits / no risk
+1	some positive benefits / no risk
0	negligible impacts or benefits
-1	some negative impacts / medium risk
-2	strong negative impacts / high risk

The majority of the screening criteria apply to both supply and demand options, with a few criteria aimed specifically at either supply or demand, as seen in Table 3-2. There are 14 scoring criteria applied to all options, with a further two criteria applied to supply or demand options separately, which could in theory lead to total scores ranging from -32 for options with strong negative impacts and risks, to +32 for options which provides strong positive benefits to environment and society.

Once the scores were accumulated and compared across options, a feasible list of options was retained, and those rejected added to the rejection register, along with details as to why they were rejected. The decision on where the cut-off point was drawn to derive the feasible options was inevitably subjective, and as acknowledged in the Environment Agency's environmental assessment supplementary guidance[18], is dependent upon creating a manageable list of options. To make this decision, we considered the following:

- Whether the feasible list was manageable to derive necessary valuations across best-value planning criteria
- Whether it provided sufficient options to provide real choice in the decision-making problem relative to the scale of the supply-demand balance
- Whether the options initially selected could solve the scale of the supply-demand balance issue.

[17] Environment Agency (Feb 2021). Water Resources Planning Guidelines.
[18] Environment Agency (Mar 2021). Water resources planning guideline supplementary guidance – Environment and society in decision-making

Table 3-2: Screening criteria

Screening criteria		
Relevant options	**Screening Criteria**	**Assessment (-2 negative impact to +2 positive impact)**
All options	Yield (demand reduction or supply increase)	Is there is a risk the option will not contribute a significant reduction in demand or increase in supply?
All options	Lead time	Is there is a risk the lead time for this option is outside of the desired planning programme to meet supply-demand deficit?
All options	Risks and uncertainties	Is there a significant risk that customers won't engage with the idea and/or demand won't be reduced? Is there a risk of losing this additional resource in future due to climate change?
All options	Water quality (drinking water safety plans)	Is the option likely to pose a risk to drinking water quality or the deterioration of raw water quality?
All options	Promotability	How promotable is the option to customers? Would CCGs have any reservations on the option? Is it a controversial source of water?
All options	Flexibility	Is the option flexible? Can it be scaled up or down easily? Will it be useful in numerous different future scenarios?
All options	Operational costs and carbon costs	Will the option have an impact on operating costs and carbon costs?
All options	Social impacts	Is there a socio-economic risk? Will customers from specific backgrounds be impacted more than others?
All options	Environmental Impact (SEA, HRA, RBMP, WFD)	Is there a chance that the option will contravene environmental regulations? (SEA / HRA / WFD / RBMP)
All options	Biodiversity net gain & invasive non-native species	Does this option pose a risk to biodiversity net gain? Will it create new pathways for INNS?
All options	Other option specific constraints	Are there any other constraints to this option?
All options	Cost uncertainty	Is the cost of the option too high? Is there a risk of uncertainty around the cost?
All options	Greenhouse gas emissions	Is there a risk this option will lead to increased greenhouse gas emissions during construction and operation?
All options	Dependencies	Is this option dependent on other options being developed or external factors? Is there a risk associated to this?

Screening criteria		
Relevant options	**Screening Criteria**	**Assessment (-2 negative impact to +2 positive impact)**
All options	Natural capital	Is there a risk that this option will affect natural capital? Including reduction in flood alleviation, reduced carbon intake from trees
Demand only	Difference from baseline	How does this option differ from our baseline activities?
Demand only	National or sector policy	Is there a risk this option will differ from accepted sector policy or national strategies?
Supply only	Area/location of options	Are there likely to be any issues relating to the area/location of proposed option? Land use changes, designated sites etc
Supply only	Operational features (uncertainty)	Are there any uncertainties around the operational features of this option?

At this stage of option screening, the evaluations were still at a relatively high level, and so the scoring provided an estimate of the feasibility of each option ahead of further detailed assessments. Options from previous WRMPs had more information available than new options proposed, via previous feasibility studies and reports, so there was more confidence with the screening results for these options.

For new options, as much information that was available was gathered, guidance consulted and expert judgement used from arrange of stakeholders do develop inputs to screening criteria around cost, expected yields, risks, promotability and embedded carbon. The Wessex Water Science, Engineering and Production teams provided a lot of information on new treatment methods required for Production side options, as well as advice on the operational carbon impacts of these treatments.

In addition to reviewing the scores with internal stakeholders, an in-house GIS system was used to highlight option locations in relation to statutory designated (and non-designated) areas. For new transfers, it could then be established whether a pipeline route between two locations would be feasible or not.

Consultation meetings were held with members of the Environment Agency between October 2021 and January 2022. These meetings allowed for any concerns about individual options, or option types, to be highlighted. One particularly relevant session involved discussions about our mothballed sources, for which we currently hold an abstraction licence, but have not used recently. This session provided Wessex Water with more information about what investigations would be required before bringing a mothballed source back into supply, as well as highlighting the flow compliance risks associated with progressing these.

3.2 Screening Reviews

The overall aim was to produce a list of Feasible Options, encompassing a range of demand and supply schemes which could be deployed across the region and over relevant time scales. The initial outcome of the screening resulted in a Feasible Option list which had a mix of options with large and small yields and long and short lead times.

Consistent with the Environment Agency guidance and in order to ensure the Feasible Option list was manageable and could provide a range of options over different time scales, a review of the options was conducted. The initial screening was favouring options with smaller yields as they tend to be less complex, have lower costs, and are generally more promotable to customers as they can have fewer negative impacts upon the environment (i.e., smaller influences on natural habitats and carbon emissions).

The review was completed using a combination approach and in a similar fashion to the Unconstrained Options development, through meetings and discussions with internal experts from various departments across Wessex Water. To begin the review, we grouped the options together by lead times, and set different progression scores for each group. Lead time was chosen as a key parameter due to the supply-demand balance evolution through the planning horizon, and there was therefore a need for new options to provide yield benefits in the short, medium and long-term. The correlation between lead time and yield of options was also quite strong, with options with shorter lead times, having lower yield benefits.

The Unconstrained Options list was arranged by lead times into groups as follows, and then scores adjusted to allow options in each group to progress to the Feasible list:

- Less than 5 years (short-term options)
- 5-15 years (medium-term options)
- More than 15 years (long-term options).

Following the lead time groupings, we also reviewed the options to maintain enough option types and locations. Whilst Wessex has one water resource zone, there are specific locations within our network where we will see reductions in deployable output from licence reductions and Environmental Destination. To get a good balance some options were selected which scored lower than others of the same type, but were more suited geographically to maintain supply in our areas constrained by peak demand failures. Examples of this include selecting the highest scoring reservoir options in each catchment, as opposed to progressing with the highest ten reservoirs given a lot of these were located within the same area.

A range of information was used in the assessments, including GIS which showed the locations of options compared to environmentally sensitive sites and where the water was needed. This helped to refine the number of options.

3.3 Rejection register

The reasons for not progressing each option have been detailed within a rejection register. There are a variety of reasons for rejecting options at this stage, with recurring trends summarised below for each option category.

3.3.1 Customer side management options

Many customer management options were rejected due to the high level of uncertainty that they would deliver upon the yield savings. Numerous options could have led to initial decreases in demand but would have been hard to maintain in the future. Some options included tariff changes linked to the supply demand balance, but were deemed to be unpromotable to customers as the factors influencing tariffs were not in their control.

Other options within the customer management category were rejected as they would not be achievable without government intervention and backing. For example, it would be very difficult for us to insist upon water labelling and apply mandatory water efficiency standards to new building developments within our supply area. However, we did include government labelling in our scenario work.

We explored government and Ofwat expectations about reducing leakage and PCC as well as installing a smart network. To do this, we combined options into 16 scenarios which considered different metering and water efficiency technologies. A full list of scenarios is given in Annex B.

3.3.2 Distribution side management options

As stated earlier, individual leakage options, such as customer side leak repairs and active leakage control, were combined with others to create seven leakage scenarios. These scenarios recognise the interplay between different elements of leakage reduction so that the costs we produced were optimised. For instance, early investment in mains renewal has an initial impact on leakage which means that fewer alternative options (such as pressure management) are needed. This strategic approach to optimising leakage reduction also helped to maintain a more manageable list so we could explore the different leakage strategies on the supply demand balance and on the total cost of the WRMP. Details of the leakage scenarios are provided in Annex B.

3.3.3 Production side management options

Improvements to various production sites were deemed unnecessary upon review, following more detailed discussions with the Environment Agency on Environmental Destination and WINEP outcomes. These discussions highlighted that abstraction licences would be reduced at some of our sources during dry year critical periods.

There were also several unconstrained options to reinstate mothballed water treatment works which were rejected upon consultation with local Environment Agency teams. Rejections of these options were due to the impact of abstraction upon the local waterbody flows and ecology, preventing the achievement of their status objectives. However, there were options which were agreed to be included in the feasible options list where the environmental impact was felt to be relatively low.

3.3.4 Resource side management options

The new resource options are generally larger in scale, with greater yield benefits but also, in some cases, a greater negative impact upon the environment. Examples of these options include desalination plants, water recycling schemes, new reservoirs, or expansion of existing reservoirs.

Some options proposed were initially rejected due to their location, which could have impacted upon statutory-designated areas (SSSI's, National Parks, SPAs, RAMSAR sites etc.); created a new pathway for the spread of invasive non-native species (INNS) and had an impact on society by changing land uses in recreational areas. All of these reasons, in addition to others, would also contribute to low promotability of the option to customers.

Our consultants undertook a review of all the new reservoir and water recycling options that were developed and identified the best sites based on factors, such as geology, river flows and availability of effluent (for water recycling schemes). Details on the approach for refining the reservoir and water recycling schemes are provided in Annex C.

The outcome of the review was a list of over 70 supply options in the Feasible Options list, from the initial Unconstrained Option list of over 360 options. In addition, there were a large number of demand and leakage options. A list of the rejected options and reasons for rejection are included in 0.

The Direction sets out how we must include a ranged of leakage and demand reduction options. Our demand options portfolios combine leakage, metering and water efficiency strategies and are summarised in Table 3-3.

3.3.5 Feasible Options

A summary of feasible demand option portfolios, and supply options are shown respectively in Table 3-3 and Table 3-4.

For our revised draft plan, our previous feasible list of demand management and leakage options was further developed into seven holistic demand management option portfolios. This process was driven by a new statutory DI reduction target being confirmed, an increase in the supply deficit forecast from 2035 and government steer to consider more ambitious smart metering options. Elements of the original feasible list that had undergone the options screening process were taken forwards with some adjustments to align with the new drivers.

Table 3-3: Summary of feasible demand option portfolios

Option Name	Option Description	DI reduced by 20% by 31/03/38	Leakage reduced by 50% by 31/03/50	PCC reduced to 110 l/p/d 31/03/50	NHH demand reduced by 15% by 2050	Total demand saving (Ml/d)
Demand Strategy 1	**Leakage:** Linear to 2050 **Metering:** Full smart metering by 2030 **HH WE:** largest feasible scale by 2030 **NHH WE:** largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	Yes	Yes	Yes	2030: 36.50 2038: 60.12 2050: 92.74

Demand Strategy 2	**Leakage:** Slow to 2050 **Metering:** Full smart metering by 2037/38 **HH WE:** 2/3 largest feasible scale by 2037/38 **NHH WE**: 2/3 largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	No	No	No	No	2030: 17.02 2038: 41.02 2050: 63.46
Demand Strategy 3	**Leakage:** Hold from 2040 **Metering:** Full smart metering by 2050 **HH WE:** 1/3 largest feasible scale by 2050 **NHH WE:** 1/3 largest feasible scale by 2050 **WE labelling:** Defra Scenario 1	No	No	No	No	2030: 13.23 2038: 30.95 2050: 62.10
Demand Strategy 4	**Leakage:** Hold from 2040 **Metering:** Full smart metering by 2030 **HH WE:** Home Check largest feasible scale by 2030 **NHH WE**: largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	No	No	No	2030: 32.88 2038: 48.62 2050: 66.50
Demand Strategy 5	**Leakage:** Fast to 2030 **Metering:** Full smart metering by 2030 **HH WE:** Home Check largest feasible scale by 2030 **NHH WE:** largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	Yes	Yes	Yes	2030: 41.44 2038: 63.08 2050: 92.74
Demand Strategy 6	**Leakage:** Slow to 2050 **Metering:** 50% smart metering by 2050 **HH WE:** Home Check 1/6 largest feasible by 2050 **NHH WE:**1/6 largest feasible by 2050 **WE labelling:** Defra Scenario 1	No	No	No	No	2030: 6.89 2038: 19.23 2050: 44.43
Demand Strategy 7	**Leakage:** Linear to 2050 **Metering:** Full urban smart metering (75%) by 2030, rural also by 2035. **HH WE:** Home Check largest feasible scale by 2030 **NHH WE:** largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	Yes	Yes	Yes	2030: 28.48 2038: 61.26 2050: 88.39

Table 3-4: Summary of Supply Options

For security reasons this table has been redacted and edited for the version that is published on our website.

Scheme reference	Scheme Title	Type of scheme	Brief description	Deployable Output (Average) (Ml/d)	Deployable Output (Peak) (Ml/d)
18.01	Somerset Spine main upgrade	Transfer	The option reinforces an existing transfer to move water east towards Yeovil from the Taunton area.	3	6
18.02	CALM main upgrade and reversal	Transfer	The option reinforces and reverses an existing transfer that will move water East from the West of our supply system and the Yeovil area towards Warminster area.	10	20
18.09	Chippenham to Devizes transfer upgrade	Transfer	The option reinforces an existing transfer to move water from the Chippenham area to the Devizes area to help overcome licence losses in the Devizes area.	3	8
18.1	West Somerset Reservoirs transfer upgrade	Transfer	Reinforcement of existing water transfers from the Bridgwater to Taunton area	3	6
18.26	Bristol import increase towards Trowbridge	Transfer	An increase in water imported from Bristol Water in the Bath area and transfer towards the Trowbridge and Melksham area.	4	7
18.27	Pewsey Resilience I	Transfer	Network reconfiguration to improve local connectivity and provide increased yield benefit/resilience in the local area in the Upper Hampshire Avon catchment	1	1.15
18.28	North Bath Resilience	Transfer	The option reinforces and increases connectivity in the existing network between South Bath and North Bath, supported by variation in the import volume from Bristol Water	2.5	3
19.03	SWW Reservoir Pump Storage - Tiverton to	Transfer	This option is a Strategic Resource Option (SRO) for the West Country Water Resource Group and has followed the information presented in the Gate One Report (July 2021). The scheme involves pumped storage to	7	10

	Taunton Transfer		increase the yield from a reservoir in Devon, which would reduce the SWW demand on a Exmoor Reservoir. This increases the available resource from which could be treated by South West Water (SWW) and pumped to Wessex Water via a new main.		
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	Transfer	The option transfers additional water from the River Severn, as released through upper River Severn reservoir operation, via Bristol Water's system into Wessex Water's system through new transfers. This option is for WCWRG as a sole requestor (and therefore no Vyrnwy Bypass Cost), with 15 Ml/d entering the Wessex Water network.	7.5	15
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	Transfer	The option transfers additional water from the River Severn, as released through upper River Severn reservoir operation, via Bristol Water's system into Wessex Water's system through new transfers. This option is for WCWRG as a sole requestor.	15	30
19.1	Severn-Thames Transfer: multiple receivers at 15Ml/d	Import	The option transfers additional water from the River Severn, as released through upper River Severn reservoir operation, via Bristol Water's system into Wessex Water's system through new transfers. This option is for multiple receivers, and therefore the costs are different to the sole receiver options.	7.5	15
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	Import	The option transfers additional water from the River Severn, as released through upper River Severn reservoir operation, via Bristol Water's system into Wessex Water's system through new transfers. This option is for multiple recievers, and therefore the costs are different to the sole reciever options.	15	30
21.06	Yeovil transfer to Dorchester	Transfer	Transfer of water from the Yeovil area towards Dorchester	4	14
21.1	Bristol import increase towards Chippenham	Transfer	An Increase in water imported from Bristol Water in the Bath area and transfer towards the Chippenham area.	3	6
21.11	Devizes resilience: Calne	Transfer	Reinstatement of an existing mothballed source in the Calne area and transferring the water to the Devizes area.	0.5	0.5

	to Devizes new transfer				
21.12	Pewsey resilience II	Transfer	New transfer from south of Devizes towards the Pewsey area to offset licence reductions in the Upper Hampshire Avon and River Bourne area.	1	3
21.13	Salisbury to Amesbury to Tidworth Transfer	Transfer	Transfer of water from the Salisbury area north towards Amesbury	10	15
21.14	Amesbury to Tidworth transfer	Transfer	Transfer of water from the Amesbury areas north towards Ludgershall	6	6
22.04	Weymouth Source Improvements	Transfer	Network reconfiguration and treatment works improvement in the Weymouth area to increase yield from a local source.	2.5	1.63
23.01	Yeovil Reservoir peak capacity	Expansion of existing WTW	Increase the peak output capacity of a reservoir near Yeovil by 4Ml/d through an upgrade of existing treatment processes.	0	4
25.01	Mendips to Stour	Reservoir	Option takes water from the Mendips quarry source and pumps this into the river Stour in Dorset to offset licence reductions and maintain existing abstraction in the Stour catchment.	12	35
25.03	Grid reinforcements - Wylye valley	Transfer	Transfer of water from the Warminster area, potentially supported by a new Mendip quarry reservoir, towards Salisbury	4	4

25.04	South Grid Resilience	Transfer	Reinforcement of the existing network to transfer water from the Stour Valley area near Poole towards Dorchester	4	14
25.05	North Grid to South Grid reinforcements	Transfer	Reinforcement of the existing network, potentially supported by a new Mendip quarry reservoir, to transfer water from the Warminster area south towards Poole	2.75	10
26.17	Reinstatement of mothballed sources - West Dorchester	Groundwater	Reinstatement of an existing mothballed source site west of Dorchester.	2.55	4.5
27.04	Under-utilised licence - Wimborne Minster	Groundwater	The option increases the maximum output of a source on the River Stour near Poole to maximise existing licence use through additional source treatment.	0	5
30.02	Pump Storage - Quantock Reservoir	Transfer	Pump storage scheme to help conserve reservoir storage in the winter for summer use, by pumping from a local river in winter time, when there is more flow in the river, into a reservoir in the Quantock hills.	2	0
31.02	Raising Dams - Yeovil Reservoir	Reservoir	Increase the capacity of an existing reservoir in the Yeovil area and the River Yeo by increasing the size of the current earth embankment.	5.4	0
32.03	New Reservoir - Yeovil	Reservoir	New reservoir near Yeovil of 7000Ml in a tributary of the River Yeo catchment.	11	22
32.13	New Reservoir - Dorset Frome	Reservoir	New reservoir in the River Frome catchment near Dorchester	13	19.4
32.24	New Reservoir - Parret	Reservoir	New reservoir in the River Parrett catchment near Yeovil	9	13.4
32.36	New Reservoir - Bristol Avon	Reservoir	New reservoir in the Bristol Avon catchment near Chippenham	11.5	17.6

33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	Groundwater	The option builds on earlier work and includes an option to inject water following pre-treatment into an aquifer in the Wareham basin for storage, with subsequent abstraction, treatment and distribution.	8	18
34.08	Groundwater - Hampshire Avon I	Groundwater	The option involves moving existing abstraction licences in the Hampshire Avon downstream to a new site(s) where there is additional and more sustainable flow in the river. The water would be abstracted, treated and transferred back north into the Wessex Water supply system for distribution.	9	15
34.09	Groundwater - Hampshire Avon II	Groundwater	The option involves moving existing abstraction licences in the Stour downstream to a new site(s) where there is additional and more sustainable flow in the river. The water would be abstracted, treated and transferred back north into the Wessex Water supply system for distribution.	6.5	12
34.1	Amesbury boreholes	Groundwater	The option involves moving existing abstraction licences in the Upper Hampshire Avon downstream to a new site(s) where there is additional and more sustainable flow in the river. The water would be abstracted, treated and transferred back north into the Wessex Water supply system for distribution.	4	4
34.11	West Salisbury Boreholes	Groundwater	The option involves moving existing abstraction licences in the Upper Hampshire Avon downstream to a new site(s) where there is additional and more sustainable flow in the river. The water would be abstracted, treated and transferred back north into the Wessex Water supply system for distribution.	14.3	14.4
36.02	Desalination: North Coast Bristol Water - Avonmouth	Desalination	This option involves the construction of a seawater desalination plant on the Bristol Channel within the Bristol Water supply area. The water is then distributed throughout the Wessex Water system via a series of pumped transfers and stored in service reservoirs.	7.5	30
37.05	Water recycling - Bridgwater Reservoir	Water recycling	The option involves treating water recycling effluent to a high standard and using this to supplement existing refill sources for an existing reservoir in Somerset.	5	0

37.06	Water recycling - Quantock Reservoir	Water recycling	The option involves treating water recycling effluent to a high standard and using this to supplement existing refill sources for an existing reservoir in Somerset.	3.5	0
37.07	Water recycling - North Somerset Non Household	Water recycling	The option involves treating water recycling effluent to a high standard and using this to meet non-household (non-potable) water consumption for an industrial site in Somerset.	4	0
37.1	Water recycling - Taunton Canal	Water recycling	The option involves treating water recycling effluent to a high standard and using this to supplement existing refill sources for an existing reservoir in Somerset.	5	0
38.01	Underutilised licence due to water quality: Purbeck	Expansion of existing WTW	Increase the output of a source near Wareham in Dorset through additional treatment processes to treat for water quality issues.	4.45	5.7
38.04	Under-utilised licence - Mid Dorset	Groundwater	Increase output from an existing source in mid Dorset through additional water quality treatment	0.96	0
38.06	Under-utilised licence - Mid Stour II	Expansion of existing WTW	Increase the output of a source near Poole, Dorset through additional treatment processes to treat for water quality issues.	0	6
38.11	Under-utilised licence - East Dorchester Source	Expansion of existing WTW	Increase the output of a source near Dorchester through additional treatment processes to treat for water quality issues.	0	6
38.12	Treatment improvements - East Weymouth Source	Treatment Improvements	Increase output from an existing source near Weymouth through some additional water quality treatment.	3	6
39.01	Under-utilised licence - North East Bath	Replacement of existing WTW	Increase utilisation of a small reservoir North of Bath to help meet peak demands through a new pre-treatment works, and use of existing infrastructure for ongoing treatment and distribution.	0.41	5

39.02	Under-utilised Licence - North Warminster	Groundwater	The option involved drilling two new boreholes at an existing site north of Warminster to improve the yield of the source	2.5	2.5
41.01	Drought Permit - Stour Catchment	Drought Permit Option	Increase annual licence during drought conditions from sources in the Stour and Frome catchments	2.08	0
41.06	Drought Permit - Bride Catchment	Drought Permit Option	Increase peak output from a source in the Bride catchment during drought conditions	0.1	1.1
52.02	Poole Water Recycling and Transfer – Stour use 50%	Water recycling	Option to use highly treated effluent in the Poole area to support flows in the River Stour and enable existing abstraction to continue in the catchment	5.25	12.5
52.03	Poole Water Recycling and Transfer – Stour use 100%	Water recycling	Option to use highly treated effluent in the Poole area to support flows in the River Stour and enable existing abstraction to continue in the catchment	10.5	25
54.01	Mendips to Grid	Transfer	Modular option to take water from the Mendip quarry option and distribute this into the Wessex Water system near Warminster	23.7	35
54.03	Mendips to Trowbridge	Transfer	Modular option to take water from the Mendip quarry option and distribute this into the Wessex Water system near Trowbridge	23.7	35
54.04	Mendips to Grid and Trowbridge	Transfer	Modular option to take water from the Mendip quarry option and distribute this into the Wessex Water system near Trowbridge and Warminster	30	70
54.05	Mendips to Stour - 50% capacity	Transfer	Modular option to take water from the Mendip quarry option and distribute this into the river Stour to enable abstraction to continue at existing sources	8.75	17.5
54.06	Mendips to Grid - 50% capacity	Transfer	Same as option 54.01 but half capacity.	8.75	17.5
54.07	Mendips to Trowbridge - 50% capacity	Transfer	Same as option 54.03 but half capacity.	8.75	17.5

54.08	Mendips to Grid and Trowbridge - 50% capacity	Transfer	Same as option 54.04 but half capacity.	23.7	35
55.01	CALM main upgrade and reversal - 10Ml/d pt1	Transfer	Option to reverse an existing transfer in the supply system and take water from the Yeovil area and transfer this towards the Warminster area.	5	10
55.03	South Grid Resilience - 8Ml/d pt 1	Transfer	Option to increase transfer of water from sources in the Dorset Stour towards Yeovil.	3	8
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	Transfer	Option to increase transfer of water from the Warminster area towards Poole, potentially supported by a new Mendip quarry option.	1.5	5.5
55.09	Trowbridge to Devizes	Transfer	Option to transfer water from the Trowbridge area towards Devizes to help offset the impact of licence reductions and meet local demand	6	12
55.1	Trowbridge to Market Lavington	Transfer	Option to transfer water south from the Trowbridge area towards the Hampshire Avon catchment, potentially supported by the Mendip Quarries or an increase in the import from Bristol Water.	5	8
55.11	Trowbridge to North Warminster	Transfer	Option to transfer water south from the Trowbridge area towards the Hampshire Avon catchment, potentially supported by the Mendip Quarries or an increase in the import from Bristol Water	2.5	5
55.12	Yeovil to Dorchester - 7Ml/d	Transfer	Modular option to transfer water from the Yeovil area towards Dorchester	2.5	7
56.01	West Salisbury Boreholes - 7Ml/d	Groundwater	Modular option to move existing abstractions downstream in the Hampshire Avon	7	7
58.01	Bristol Bulk Import - 15Ml/d	Transfer	Option to increase the existing import from Bristol Water near Bath and transfer this through the system towards the Hampshire Avon catchment	10	15

59.01	Mere Stream Support	Groundwater	Option to provide stream support to an upper Dorset Stour tributary to allow current abstraction in the catchment to continue.	5	5
70.01	Bristol Import and onwards transfer I	Import	This option is a combination of the following schemes: 18_26 and 18_09	4	7
70.02	Bristol Import and onwards transfer II	Import	This option is a combination of the following schemes: 18_26 and 18_09 and 21_12	4	7
70.03	Bristol Import and onwards transfer III	Transfer	This option is a combination of the following schemes: 58_01 and 55_10 and 55_11 and 55_09	10	15
70.04	Bristol Import and onwards transfer IV	Transfer	This option is a combination of the following schemes: 58_01 and 55_10 and 55_11	10	15
70.05	Bristol Import and onwards transfer V	Transfer	This option is a combination of the following schemes: 58_01 and 55_10 and 55_11 and 21_13 and 25_03 and 21_14	10	15
70.06	Increased Reservoir Capacity and East Transfer	Expansion of existing WTW	This option is a combination of the following schemes: 23_01 and 18_02	0	4
70.07	Hampshire Avon Boreholes and Transfer	Groundwater	This option is a combination of the following schemes: 21_13 and 21_14 and 34_11	14.3	14.4

4. Stage 3: Feasible Options Development and Assessment

Stage 1 and 2 detailed the process to establish the Feasible List of options. This following section details the detailed assessments undertaken on the Feasible Options to generate the Constrained Options for programme development. Stage 3 consists of two aspects, the option development (i.e., details design, costing, yield analysis etc.) and the environmental assessments (i.e., SEA, HRA etc.)

The outcome of Stage 3 was a detailed assessment of each supply option or each leakage and demand management scenario. These assessments included information on the costs of each option (e.g., the CAPEX and OPEX) and the environmental and societal impacts of each option (e.g., performance against SEA objectives). These metrics include:

- CAPEX (capital expenditure, covering instrumentation, land, construction and mechanical engineering)
- OPEX (operational expenditure, covering energy and chemical usage)
- Embedded carbon
- Operational carbon
- MCA - Embedded carbon intensity
- MCA - Operational carbon intensity
- MCA - SEA score
- MCA - Biodiversity Net Gain Burden
- MCA - Natural Capital Net Impact

These metrics, along with the option lead times and yields, were applied to the EBSD modelling tool in Stage 4 to generate the preferred plan and alternative plans.

4.1 Options Development

This section details the process undertaken to develop and scope the Feasible Options.

4.1.1 Supply Options Option Scoping and Design

This section of the document sets out the approach used to ensure that the process for identifying and understanding the benefits and costs of each option was robust and met the requirements of the WRPG. The team undertaking this work included Wessex Water subject matter experts and consultants from organisations such as HR Wallingford, Chandler KBS, Mott McDonald, RPS and Wood.

To ensure consistency across all options, a standard template was developed for all the supply schemes. This template contained information such as the yield of the option, the key assets (e.g., the number of pumping stations) and the location of the scheme, including pipe routes. It formed the scope of each option which was then used by other experts to develop the costs, environmental impacts and carbon associated with each supply option.

The data for each supply option was gathered by consultants. For instance, they calculated the size of embankments for new reservoirs and the length and diameter of new pipes. This data was then reviewed by staff in the Wessex Water operations and water resources

teams, to make sure that the scheme took into account the existing network. This was done to ensure that each option included all the right new assets, without the risk of overstating the need for new assets (for instance, making sure that we had not included the need for a new service reservoir if one was not required).

New reservoirs

Earlier work was undertaken by Wood to identify potential locations for new reservoirs. That work formed the basis of our work on new reservoir sites. Further work has been undertaken at Mendip Quarries SRO by the WCWRG.

HR Wallingford undertook a further review of the sites identified by Wood, including assessments to determine key information on each option such as:

- Dam volume
- Downstream population risk
- Permeability of the geology
- Reservoir yield and capacity

The approach is set out in Annex B.

Expansion of existing reservoirs

HR Wallingford and Wessex Water staff reviewed previous work on extending our existing reservoirs to see if there was an option to increase their yield and if so, determine the requirements of each option (such as the need for new reiver intakes).

Water Recycling options

HR Wallingford reviewed the constrained options and undertook spreadsheet modelling to determine the reliable yield from each option identified by Stantec in its work for WCWRG. The approach is set out Annex B.

Impacts upon water-receiving water bodies were assessed with respect to water quality and river flows. In each case, additional treatment at the wastewater treatment works would be required prior to transferring water to reservoirs or river (so that the water discharged into the river or reservoir did not have an unacceptable impact on water quality) and then additional water treatment at the receiving site is needed to make the water potable. Consideration of INNS was also made at this early stage.

As the work undertaken by Wood on new reservoir sites and by Stantec on water recycling sites was independent of each other, HR Wallingford reviewed synergies between options identified in the two reports.

Transfers and pipeline

Many of the options need a transfer pipeline, often with at least one pumping station. This could be at a new supply site, such as reservoir sites, or where water is needed to be transferred from an existing asset to another. The locations of each asset, with required

pipeline capacities, and storage volumes were provided to HR Wallingford, who then developed the options for these transfer pipelines.

GIS was used to determine potential routes for each pipeline, for instance avoiding hills and valleys and environmental designations, whilst a spreadsheet model was used to size pumps and pipes based on applicable design standards (e.g., maximum velocities should not exceed 1.1m/s). 0 includes a technical note on the development and use of the spreadsheet model.

Mothballed sites

In our constrained list we had identified mothballed sites which could potentially be brought back into use. HR Wallingford discussed each site with Wessex Water subject matter experts and determined the current assets at each site and option for reinstatement of each site. Options scoping was developed for each option. This included relocating sites to locations more suitable for the existing distribution network.

Existing production sites

Options were also identified at existing production sites to reduce outages related to water quality, and thereby increase maximum production capacity. Wessex Water Production and Engineering staff were able to provide details on the site-specific water quality constraints and required treatment upgrades, which HR Wallingford then collated into option templates. Examples include installation of nitrate treatment centres to maintain a reliable supply all year round at certain sites, or membrane plants at sites which are susceptible to turbidity restrictions. This work was in line with the guidance to ensure that water quality was maintained.

Through regular liaison between teams, the consultants ensured that the same principles and assumptions were maintained across all option designs. Agreed approaches were also developed for pipeline routings with respect to avoiding environmentally sensitive areas and major rail, road or river crossings wherever feasibly possible. The Wessex Water GIS was used by our consultants to ensure that they understood our existing supply network so that the relative elements could be taken into account as each option was being developed. This became an iterative process, with the Wessex Water and consultancy teams working closely together to ensure that the options were properly scoped and that they had been designed to avoid the most serious of environmental impacts.

Once the scope for each supply option had been developed, each template was forward onto other specialist consultants to carry out costing, carbon, and environmental assessment.

4.1.2 Leakage Options - Scoping and Design

For leakage options, RPS experts worked with Wessex Water leakage experts to define each option. RPS considered both distribution leakage and underground supply pipe leakage reduction options.

Where possible, RPS used data provided by Wessex Water, applying best practice techniques, experience and industry-based assumptions to develop several feasible leakage scenarios based on the individual unconstrained leakage options. These leakage scenarios were based on different leakage reduction targets, previously set out in the WCWRG work by Mott McDonald.

A base year of 2019/20 was used to minimise the impact of customer behaviour and disrupted leakage management activities during the COVID-19 pandemic and was kept consistent for each leakage scenario. Leakage rates, data relating to District Meter Area (DMA) and mains characteristics was provided via the Wessex Water leakage management system (Waternet) and GIS. This enabled RPS to build their models from a realistic starting point, knowing the condition and ages of the mains network, including the areas where leakage is historically higher.

Base cost information for each of the leakage options was provided by Wessex Water, alongside expected maintenance and asset replacement frequencies. This information was used to construct discounted and undiscounted whole life costs over the planning period.

RPS undertook modelling in its SoLOW leakage optimisation package to determine different programmes of leakage options to meet the seven leakage scenarios considered. RPS used average incremental cost (AIC) to rank the order in which schemes should be undertaken within the optimisation to provide the greatest cost-benefit from each leakage option. For the purposes of this initial assessment a scheme was assumed to be a whole single DMA. The AIC ranking process uses discounted costs applying a standard 3.5% discount rate over an 80-year discount period. The undiscounted costs for a scheme were carried through to SoLOW.

The SoLOW optimisation was used to assess the most economical combination of leakage options both in terms of amount of implementation and timing of implementation in order to achieve various leakage reduction scenarios. These leakage reduction scenarios were taken forward within the WRMP process as leakage options themselves superseding individual leakage management activity options and ensuring that leakage options were optimised.

Of the feasible leakage options considered for the draft WRMP (see Table 3-3), four options have been taken forward for inclusion in our seven combined demand management portfolios developed to show a range of options towards meeting a new distribution input reduction target and greater supply deficit from 2035.

1. Fast leakage reduction to 2030 – included in demand management options 1 & 7.
2. Linear leakage reduction to 2050 – included in demand management options 2 & 6.
3. Hold leakage reduction from 2040. – included in demand management options 3 & 4.
4. Slow leakage reduction to 2050 – included in demand management option 5.

The main activities contributing to these leakage reduction profiles is based on previous work by RPS with some internal refinement to align with preferred development of current practices. The breakdown of savings attributed to each activity for three of these four scenarios can be seen in figures Figure 4-1 to Figure 4-3 below with a summary in Figure

4-4. It should be noted that these leakage reduction profiles do not include leakage reduction realised through the benefits of smart metering on reducing customer supply pipe leaks.

Figure 4-1: Forecast leakage reduction for AMP8 split by activity for slow leakage reduction to 2050

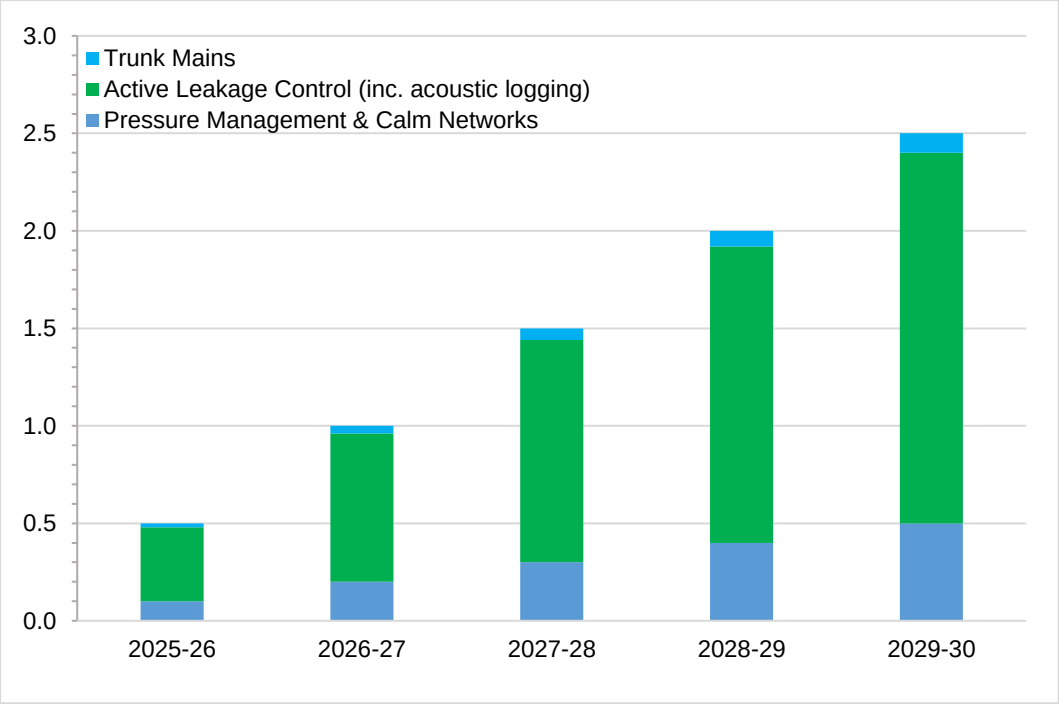


Figure 4-2: Forecast leakage reduction for AMP8 split by activity for linear leakage reduction to 2050

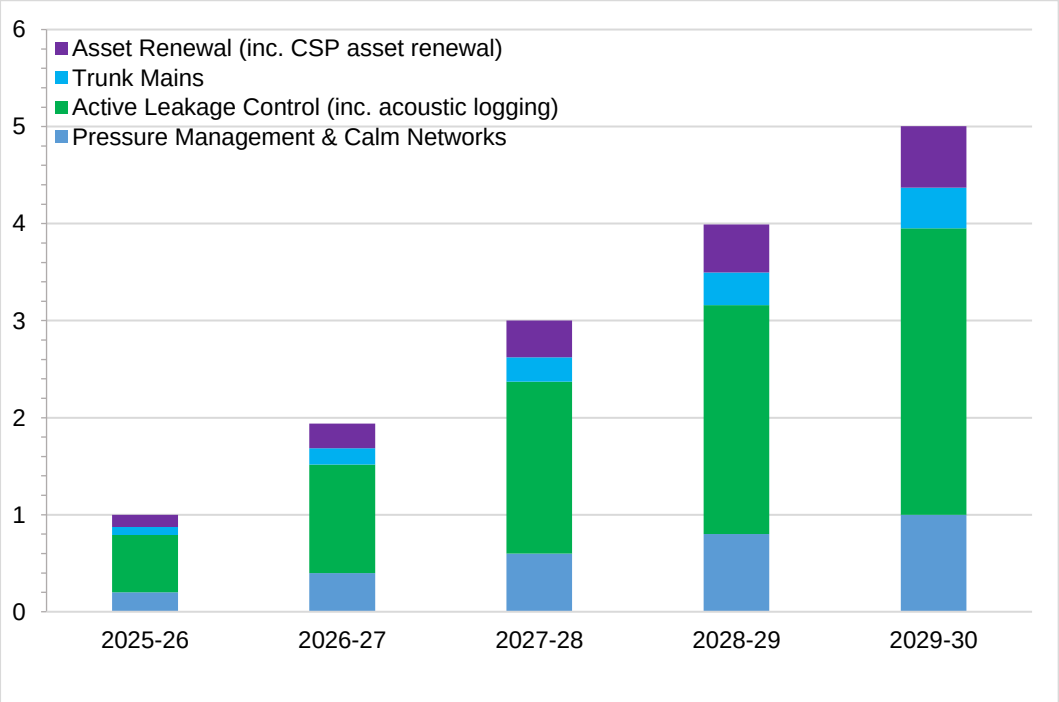


Figure 4-3: Forecast leakage reduction for AMP8 split by activity for fast leakage reduction to 2030

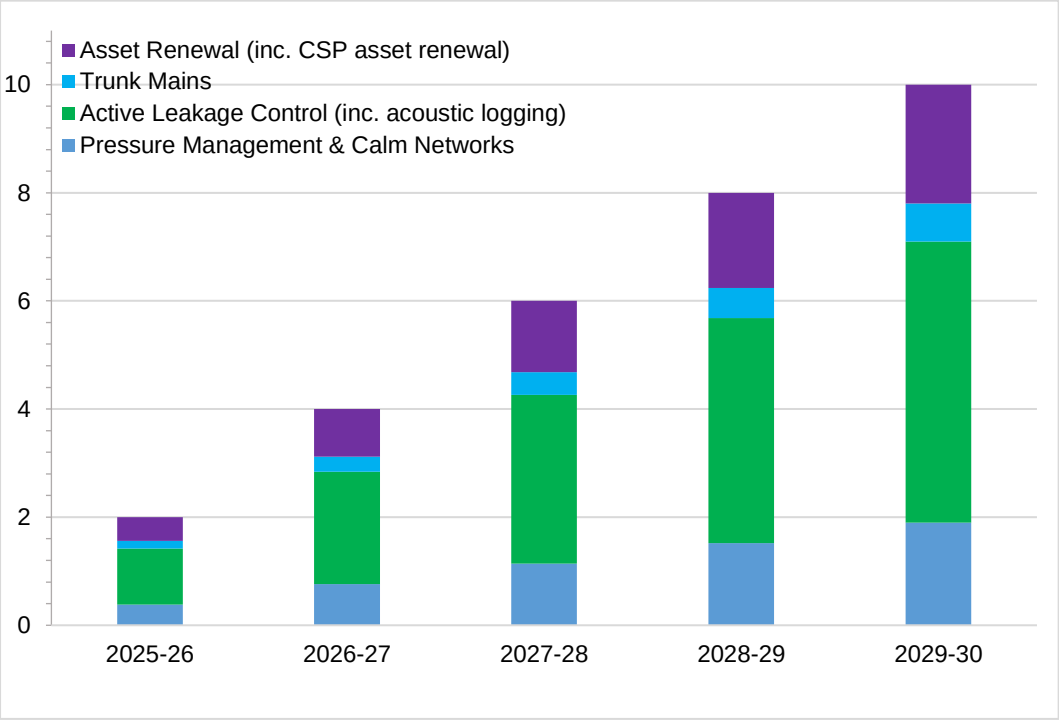
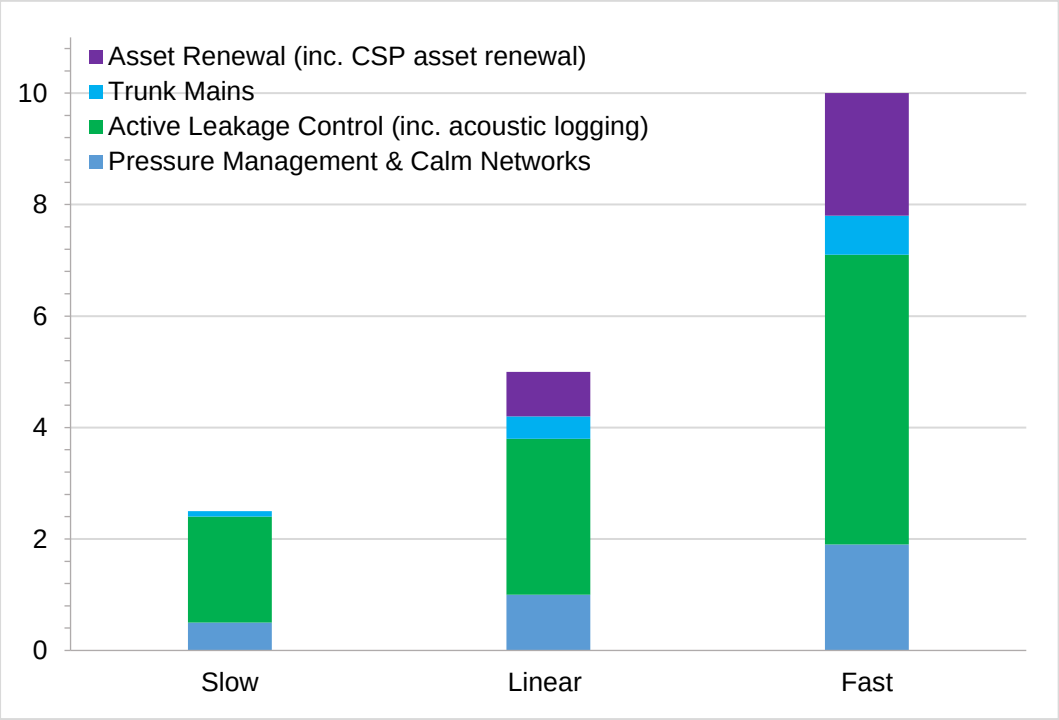


Figure 4-4: Summary forecast leakage reduction for AMP8 split by activity for three leakage reduction profiles.



4.1.3 Demand options – Scoping and Design

For the demand management options, HR Wallingford worked with Wessex Water water efficiency experts to develop the 16 different demand scenarios. HR Wallingford used

previous research undertaken by UKWIR, and more recent work published by other water companies, to determine the costs and benefits of different metering options on PCC and internal plumbing losses. Metering options can reduce supply pipe leakage and have a positive impact on consumption, and so there is a strong link between leakage options and metering options. RPS and HR Wallingford worked together with Wessex Water staff to ensure that there was consistency in the assumptions made for metering options and that there was no double-counting of costs.

The benefits of water efficiency and metering options were calculated in our demand forecast model, so that climate change, occupancy changes and other complex factors which affect demand were considered in the design of each of the 16 scenarios.

HR Wallingford reviewed various different metering strategies, including Automated Meter Reading (AMR) and Advanced Meter Infrastructure (AMI) technologies. They reviewed information published by other water companies on their trials and undertook a cost benefit analysis. They also spoke to meter manufacturers about the different technologies and obtained updated costs.

Initial work showed that AMR was less costly than AMI metering so the focus of the work was to identify how AMR metering, combined with water efficiency projects, could be best used to reduce consumption. We recognise that technology is changing rapidly, and AMI may be more cost effective in the future, but for this WRMP our analysis showed that AMR provides better value.

HR Wallingford reviewed all the other options in the constrained options list and undertook analysis to see which options would likely be part of a demand management strategy. Given the large PCC reductions that the government expects, the focus of this work became centred around strategic projects used to provide support to households and non-households via a series of water consumption surveys and follow-on support. These surveys included providing advice to customers; mending dripping taps and leaking toilets and also providing fittings (such as urinal controls in non-household properties).

The 16 demand scenarios developed consisted of different metering technologies and approaches to water efficiency, to achieve reductions in total consumption. Many of these scenarios were in line with government objectives of reducing PCC to 110l/h/d. These scenarios also included assessments about the impacts of mandatory water efficiency labelling on appliances, as currently being discussed by DEFRA.

Smart metering options

For our revised draft plan, we have further developed our feasible metering options with a focus on smart metering such that all of our feasible demand options portfolios now incorporate AMI smart metering delivery on some scale. This change in approach is a response to evolving regulatory and political steer on smart metering and an increase in the scale of challenge posed by both our revised forecast supply deficit from 2035 and new statutory distribution input target in 2037/38.

We have considered the five smart metering delivery strategies described below alongside other demand management strategies that combine in various ways to make up our demand option portfolios. These five options provide a range of pace and ambition towards reaching smart meter saturation in our region and the associated demand management benefits this will afford.

1. **Ambitious - Complete smart meter rollout by 2030** (95%-meter penetration). Included in demand option portfolios 1, 4 & 5.

2. **Fast - Achieve 75% smart meter penetration by 2030**, this equates to all meterable urban/semi-urban properties in our region. Remaining customers living in rural areas will then be targeted as soon as possible in AMP9 to complete the programme (95% meter penetration) by 2035. Included in demand option portfolio 7.

3. **Steady - Complete smart meter rollout by 2037/38.** Allows more time to achieve full rollout but completion is in-line with first major DI reduction commitment. Included in demand option portfolio 2.

4. **Slower - Complete smart meter rollout by 2050.** Included in demand option portfolio 3.

5. **Slow - 50% smart meter rollout by 2050.** Included in demand management option portfolio 6.

The two slowest roll-out scenarios, coupled with associated leakage and water effeicency strategies in their combined demand option portfolios, wouldn't enable us to achieve our statutory distribution input reduction target by 2037/38 (Figure 4-5). Leakage and per capita consumption forecasts for the two slowest roll-out scenarios also put us a significant way off achieving other associated targets (see Figure 4-6 and Figure 4-7). These scenarios also wouldn't afford us the opportunity to meet future demand in the face of abstraction licence reductions in 2035 without considerable investment in new supply-side schemes.

Initially we considered the most ambitious roll-out scenario to realise associated demand savings as soon as possible and keep pace with the smart metering transformation taking off within the industry. However, AAT testing of customers indicated that smart metering was less of a priority for them compared with other items in our business plan, and they were less accepting of associated bill increases. This has led to us moderately scaling back our ambition and opting for the second fastest delivery strategy scenario which makes up part of demand management option 7. Extending our initial smart meter roll-out over two AMPs also provides greater opportunity to innovate, this is likely to be crucial in smart metering isolated properties in an efficient way.

To help inform our smart metering options, we have engaged with Artesia consultants who have experience in this field. They have written a smart metering review focusing on the benefits and deliverability of our proposed programme. This is included as a separate appendix. We have also carried out market engagement sessions with seven prospective suppliers to help inform our technology and delivery strategy.

4.1.4 Demand Option Portfolios

For our revised draft plan, our previous feasible list of demand management and leakage options was further developed into seven holistic demand management option portfolios. This process was driven by a new statutory DI reduction target being confirmed, an increase in the supply deficit forecast from 2035 and government steer to consider more ambitious smart metering options. Elements of the original feasible list were taken forwards with some adjustments to align with the new drivers.

Each portfolio comprises different combinations of leakage, smart metering and water efficiency options, achieving a range of demand management performance and alignment with targets. These options are summarised in Table 4-1 below.

Table 4-1:Summary of demand option portfolios

Option Name	Option Description	DI reduced by 20% by 31/03/38	Leakage reduced by 50% by 31/03/50	PCC reduced to 110 l/p/d 31/03/50	NHH demand reduced by 15% by 2050	Total demand saving (Ml/d)
Demand Strategy 1	**Leakage:** Linear to 2050 **Metering:** Full smart metering by 2030 **HH WE:** largest feasible scale by 2030 **NHH WE:** largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	Yes	Yes	Yes	2030: 36.50 2038: 60.12 2050: 92.74
Demand Strategy 2	**Leakage:** Slow to 2050 **Metering:** Full smart metering by 2037/38 **HH WE:** 2/3 largest feasible scale by 2037/38 **NHH WE**: 2/3 largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	No	No	No	No	2030: 17.02 2038: 41.02 2050: 63.46
Demand Strategy 3	**Leakage:** Hold from 2040 **Metering:** Full smart metering by 2050 **HH WE:** 1/3 largest feasible scale by 2050 **NHH WE:** 1/3 largest feasible scale by 2050 **WE labelling:** Defra Scenario 1	No	No	No	No	2030: 13.23 2038: 30.95 2050: 62.10
Demand Strategy 4	**Leakage:** Hold from 2040 **Metering:** Full smart metering by 2030 **HH WE:** Home Check largest feasible scale by 2030 **NHH WE**: largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	No	No	No	2030: 32.88 2038: 48.62 2050: 66.50
Demand Strategy 5	**Leakage:** Fast to 2030 **Metering:** Full smart metering by 2030 **HH WE:** Home Check largest feasible scale by 2030 **NHH WE:** largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	Yes	Yes	Yes	2030: 41.44 2038: 63.08 2050: 92.74
Demand Strategy 6	**Leakage:** Slow to 2050 **Metering:** 50% smart metering by 2050 **HH WE:** Home Check 1/6 largest feasible by 2050 **NHH WE:**1/6 largest feasible by 2050 **WE labelling:** Defra Scenario 1	No	No	No	No	2030: 6.89 2038: 19.23 2050: 44.43
Demand Strategy 7	**Leakage:** Linear to 2050 **Metering:** Full urban smart metering (75%) by 2030, rural also by 2035. **HH WE:** Home Check largest feasible scale by 2030 **NHH WE:** largest feasible scale by 2030 **WE labelling:** Defra Scenario 1	Yes	Yes	Yes	Yes	2030: 28.48 2038: 61.26 2050: 88.39

Of the seven demand management options considered, options 1, 5 and 7 meet the statutory target for 20% reduction in distribution input (DI) per capita by 2037/38. Options 1, 5 and 7 are also the only options that meet other key targets on leakage reduction (50% reduction by 2050), and per capita consumption (PCC, reduction to 110 l/h/d by 2050). All options apart from option 6 meet the target to reduce NHH demand by 9% by 2037/38 and three options (1,5 and 7) meet the 2050 NHH demand reduction target of 15%. Most options fail to meet interim targets in 2026/27 and 2031/32 for DI and leakage reduction (see Figure 4-5 and Figure 4-6Figure 4-8), however as these targets are non-statutory and only represent a guideline glidepath, we are satisfied that our feasible options show an adequate range of ambition, considering our forecast position at the start of AMP8 and with statutory and key targets being met in several options.

Figure 4-5: Demand management option alignment with statutory distribution input target (including interim targets in 26/27 and 31/32)

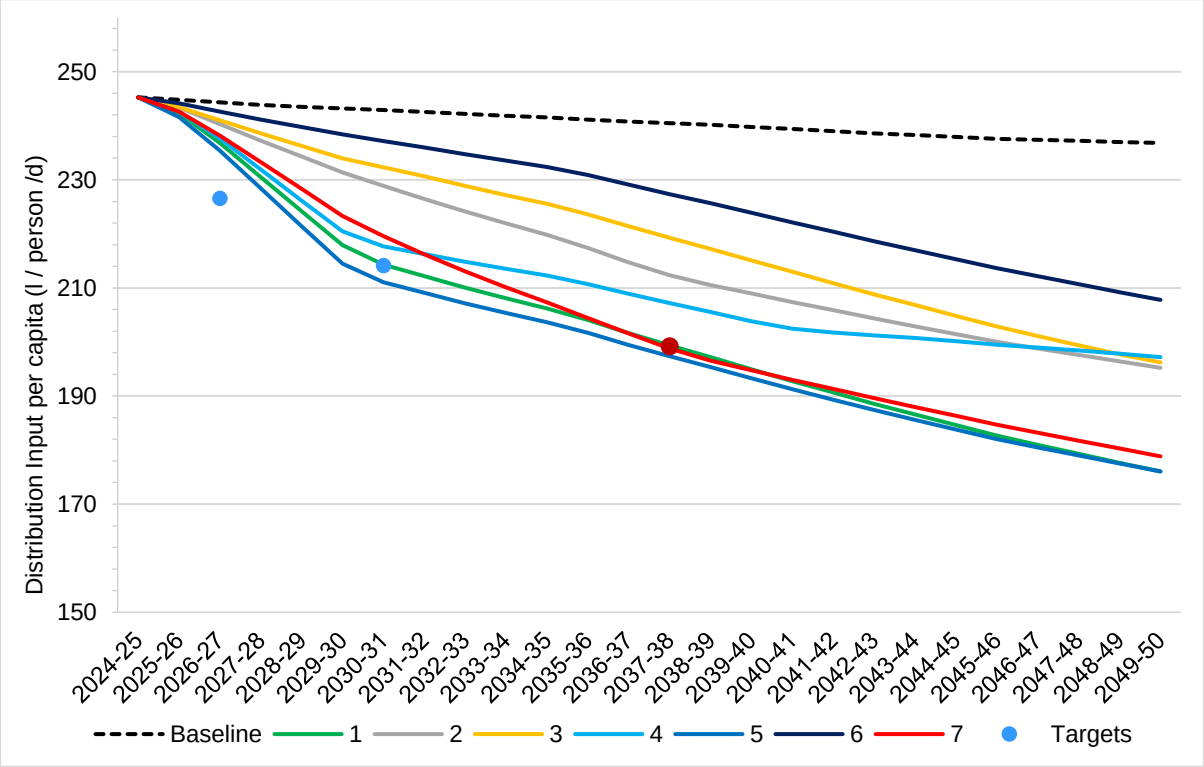


Figure 4-6: Demand management option alignment with leakage targets (including interim targets in 26/27 and 31/32)

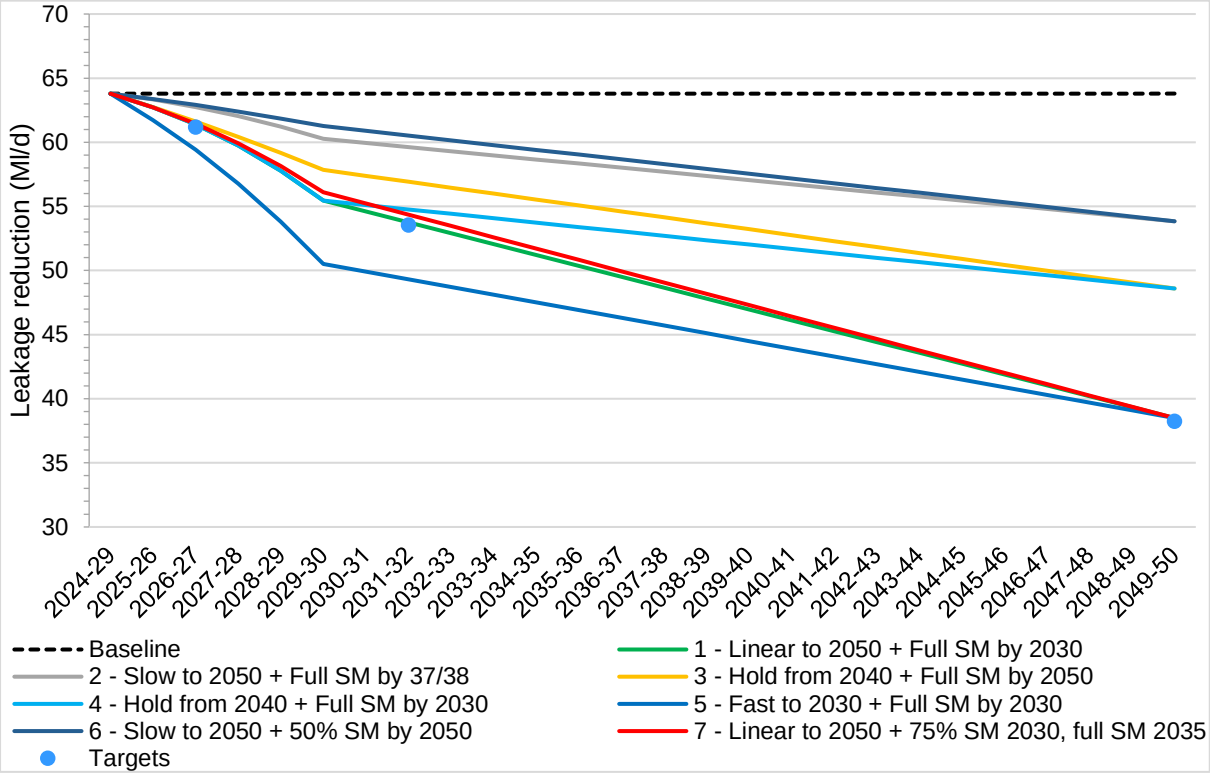


Figure 4-7: Demand management option alignment with per capita consumption targets (including interim target in 37/38)

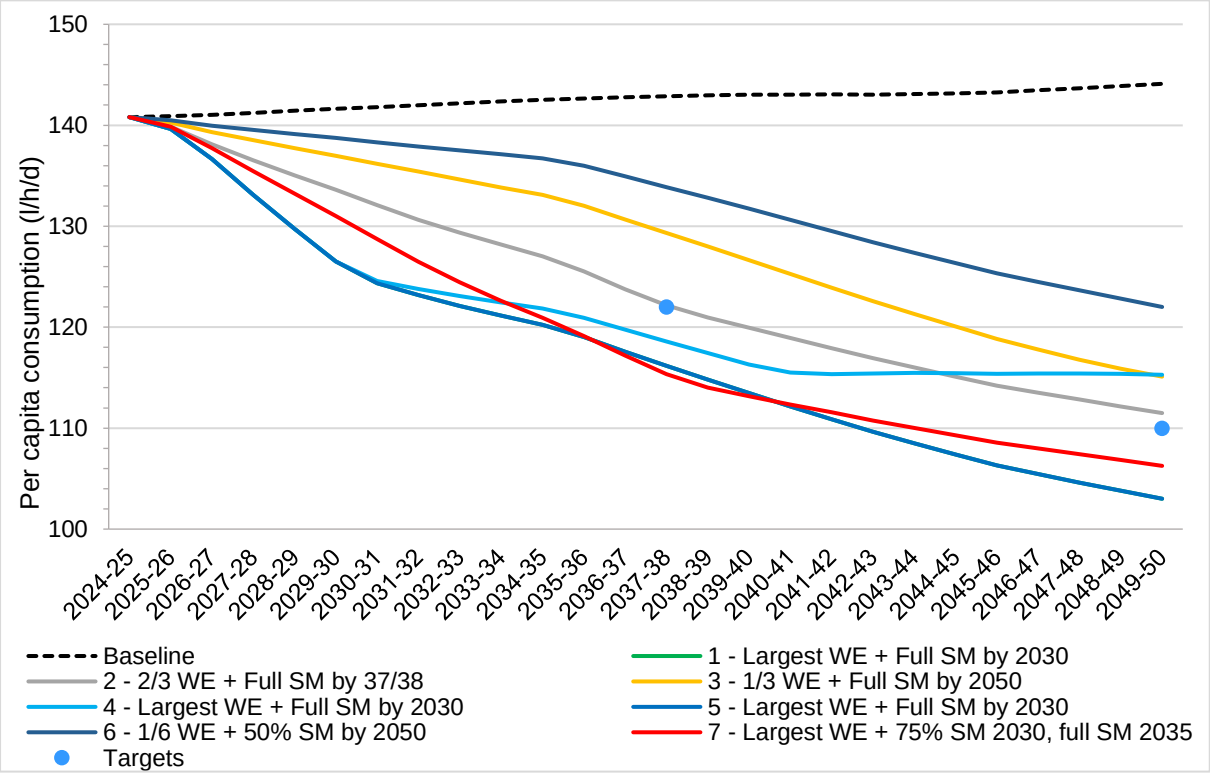
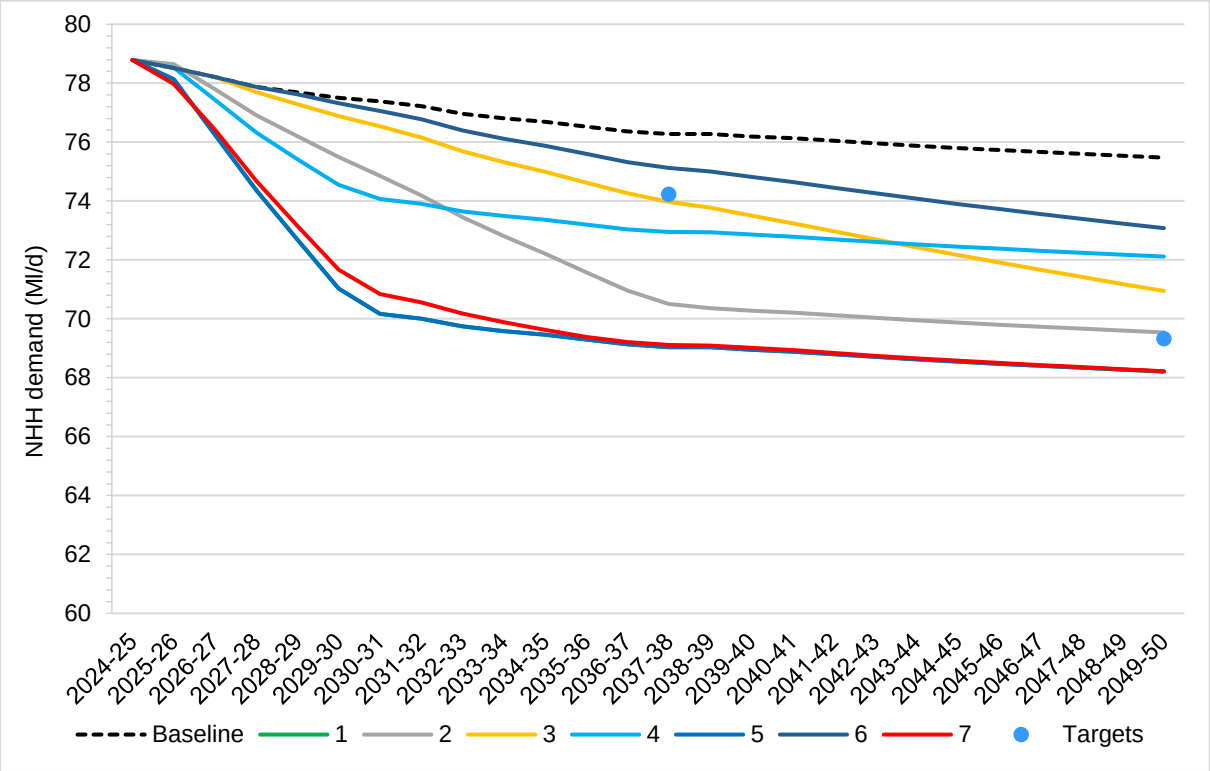


Figure 4-8: Demand management option alignment with non-household (NHH) demand reduction targets



4.1.5 Lead-in-time

Some options can be developed quickly, for instance leakage options, whilst other options such as a new reservoir take time to plan and build. Each option therefore has a lead-in-time, which is the time it takes before the option supplies water. Our option lead-in-times have been developed by our consultants and subsequently reviewed, taking into account the numerous stages of an option, from the planning phase to completion. These include feasibility studies, environmental assessments, planning applications, procurement, construction and commissioning. The options lead times were reviewed independently and externally by Julian Welbank and Stantec.

4.1.6 Further refinements to the Scoping and Design

Once the scope of each supply and demand option scenario had been developed, there was a review of the options and a further refinement phase. For instance, our consultants liaised with our own asset team to review the need for additional booster pumps on some of the pipeline routes, and some adjustments were made to the capacity of some of the transfer options to ensure that they were not oversized.

Each supply option scope and leakage and demand management scenario underwent a final review by Wessex Water subject matter experts before the final design was accepted.

Upon completion, the option information was then used by Chandler KBS, Mott MacDonald and Wood consultants for their own assessments, as described below.

4.2 Option costing

The approach to costing each option by RPS (leakage), HR Wallingford (water efficiency and metering), and ChandlerKBS (supply options) is described below.

4.2.1 Supply Schemes

Methodology and cost data

ChandlerKBS undertook the costing work for the supply options based upon their previous experience of providing similar cost estimating services to several water companies and its ongoing work on the SRO projects.

The approach used is outlined below:

- Identification of the availability and quality of data for estimating costs. This was particularly relevant for new option types, such as desalination schemes.
- Development of Capex cost estimates for various project options ensuring consistency in pricing.
- Calculation of Opex estimates for each option.
- Development of a risk register and estimates of optimism bias for each option.

Where relevant, the costing work was carried out in accordance with the Mott MacDonald Cost Consistency methodology developed for Ofwat's RAPID programme.

Cost Data

ChandlerKBS has a water sector database which comprises data from thousands of capital projects, cost models and operating cost analysis captured from UK water companies over the past 20 years. Using these models, estimated direct costs were reported for each supply option.

Price Adjustments

To adjust cost data to account for its age, a factor was applied to bring all costs onto a consistent basis of 2022. The index used was a combination of the Construction Output Price Index (COPI), which is published by the Office for National Statistics (ONS), and bespoke indices published by reputable construction organisations. To adjust cost data for UK regional differences, a factor was applied that represents the industry variation in construction costs from the cost data's base region to the estimate base region of the UK average.

Total Capex Costs

The process for deriving a total Capex cost was based on estimating direct costs consisting of aggregated labour, plant and material costs to deliver the scope in the options template. In addition to the direct cost, indirect costs relevant to the asset type were added as an uplift factor for contractor management, design and tender-to-outturn. For client, non-construction costs e.g., design, project and programme management and third-party costs, ChandlerKBS used Wessex Water specific data based on historical project delivery and cost.

Opex Costs

To derive Opex costs, ChandlerKBS used base rates for labour, power, chemicals, sludge and M&E maintenance, provided by Wessex Water.

Regional SROs

The regional SRO schemes were costed in the same way as the other options above, however these were prior to the Gate 2 costing for the schemes. As a result, the costing we developed will differ from the Gate 2 reports but will be updated for the final WRMP24.

Cost base adjustments for PR24

PR24 uses a 2022-23 cost base whereas the WRMP uses 2020-21. The adjustment for supply-side schemes have been derived using the ChandlerKBS Cost Intelligence Database (CID) which normalises capex model to a consistent base date by using the BCIS Civil Engineering Index 1191 (CivEng) – one of the few indices that are regularly published with a forecast forward. At the beginning of the WRMP24 estimating project, the costing base date was set as September 2022 (Q3 2022), but during the period of the WRMP24 estimates, significant volatility of construction costs in the market caused the September 2022 CivEng index to vary between 198.6 and 209.5. The BCIS June 2022 forecast of the CivEng September 2022 index was 202.3 which is the CivEng index value used to normalise the CID capex estimates to September 2022. Since March 2023, the BCIS have recorded the CivEng index for September 2022 consistently as 205.6. This value has not been applied in WRMP estimates. The strategic resource option estimates were reported at a base date of September 2020 – CivEng index value for September 2020 (Q3 2020) is 161.6. Using the CivEng index, adjustment of Capex between September 2020 and September 2022 is +25.19% (202.3/161.6 = 1.2519). For comparison, the ONS CPIH index adjustment for the same period is only +12.00% (122.3/109.2 = 1.11996). The CPIH is not used to adjust construction Capex.

CID Opex models are normalised to the same base date as Capex models using the ONS Retail Price Index (RPI). However, actual rates for chemicals and electricity were supplied by Wessex to ChandlerKBS so September 2022 normalising was not necessary for these items. The CID traditionally uses RPI to normalise Opex which between September 2020 and September 2022 would be +18.11% (347.6/294.3=1.1811). Opex actual rates have inflated at a significantly different rate to the RPI for the period September 2020 to September 2022 with the largest impact to Opex inflation variance in this period is the change in electricity market prices. Actual electricity rates inflated from c.9.5 p/kWh to 28.4 p/kWh (+200% increase). Due the variance in actual Opex to indexed Opex, adjusting the September 2022 Opex estimates to September 2020 using RPI does not result in a robust estimate.

4.2.2 Leakage Schemes

RPS have proven experience in developing models that describe the economic and leakage benefits for a range of leakage management techniques, having undertaken annual leakage performance and investment assessments for a number of UK water companies. Where possible, data provided by Wessex Water was used, with the initial base year being 2019/20 to minimise the impact of customer behaviour and disrupted leakage management activities

during the COVID-19 pandemic. The base data was kept consistent throughout all leakage options. Base cost information for each of the leakage options was also provided by Wessex Water, alongside expected maintenance and asset replacement frequencies. This information has been used to construct discounted and undiscounted whole life costs over the discount period. The costs were uplifted to 2022 prices to be consistent with the supply options.

4.2.3 Demand (Water Efficiency and Metering)

HR Wallingford used Wessex Water cost information where available to develop costs for water efficiency and metering scenarios. For instance, we have recently started a new project of water efficiency audits "HomeCheck" which consists of household water efficiency visits, including the costs of the water saving devices provided during these visits. Costs of AMR and AMI meters were based on published information and uplifted to be in 2022 prices. Where Wessex Water did not have specific cost information, HR Wallingford used its own information or supplier information to derive costs.

For our draft final plan, the unit costs for AMI smart metering have been derived from costs proposed by other water companies with smart metering programmes (dWRMPs, WRMPs, Green Recovery proposals), consultation with internal teams on meter installation costs, and market engagement with prospective suppliers of both smart meters and associated communication infrastructure.

Optimism Bias

The approach of estimating the optimism bias, outlined in the Mott MacDonald Technical Note and Cost Consistency Methodology was used as a framework for understanding risks. Optimism bias and uncertainty factors were generated separately for each supply option types by our experts and then ChandlerKBS calculated the values we have used in our assessments. However, for leakage and demand management options (including metering) we have current experience of the risks of these options, so a standard 10% figure was used for risk for the leakage and demand scenarios and 1.49% was used for optimism bias. Within the investment model, risk and optimism bias was included within the total costs.

4.3 Carbon assessments

All carbon assessments were undertaken by Mott MacDonald. The carbon models used utilise emissions factors from the CESMM4 Carbon & Price Book, which is used industry-wide. The assessments used the option data produced by HR Wallingford (supply options and demand management) and RPS (leakage). For supply options Mott MacDonald estimated the carbon emissions for:

- Pipelines – based on mains length, diameter and material
- Pumping stations – based on pump rating and energy use
- Service reservoir construction – based on volume
- Treatment works construction – based on the type of treatment.

The carbon assessments were split into embedded carbon, during construction, and operational carbon during the whole life usage of each option. The operational carbon

calculations assume decarbonisation of the UK power grid over time, using assumptions from HM Treasury supplementary guidance.

More detail on the carbon assessment methodology is included in 0. The carbon metrics for each option are outlined in Table 4-2.

There is inherent uncertainty in carbon estimating due to the developing maturity of carbon accounting practices and associated data. There is also additional uncertainty driven by scope uncertainty associated with level of design information available at given stages within the project lifecycle. There is currently no standardised or established guidance to assess uncertainty in carbon estimates in a consistent way and directly applying the range of uncertainty associated with cost estimates and optimism bias would likely overstate the level of uncertainty. Further ongoing work is required at a carbon estimating and accounting discipline level and within the infrastructure sector to establish a more formalised approach to assessing carbon uncertainty. Whilst no formal uncertainty range has been presented at this stage it is estimated it would be in line with the Optimism Bias and risk allowance %'s for cost.

The uncertainty range for carbon would account for:

- Uncertainty in carbon factors related to the quality and representativeness of industry level emissions factors to the specific activities undertaken and materials used on the scheme.
- Scope uncertainty associated with ensuring the carbon estimate has captured all scope requirements to fully deliver the scheme.

To improve the uncertainty in the carbon factors over time, we expect to use more supplier specific carbon data for major materials and products rather than industry generic emissions inventories. For scoping uncertainty we expect this to reduce as WRMP projects are further scoped and move through project lifecycle stages through to delivery.

Table 4-2: Feasible option carbon metrics

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Embodied carbon (tCO2 equivalent)	Average operational carbon (tCO2 equivalent)	Total carbon cost (£M)
18.01	Somerset Spine main upgrade	13121	477	11
18.02	CALM main upgrade and reversal	21475	1839	34
18.09	Devizes resilience: Chippenham to Devizes transfer upgrade	3287	130	3
18.10	West Somerset Reservoirs transfer upgrade	39	543	9
18.26	Bristol import increase towards Trowbridge	3257	48	2
18.27	Pewsey Resilience I	332	265	4

18.28	North Bath Resilience	31	68	1
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	78300	5747	109
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	34427	1733	35
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	54967	3055	61
19.10	Severn-Thames Transfer: multiple receivers at 15Ml/d	34427	1733	35
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	54967	3055	61
21.06	Yeovil to Dorchester area new transfer	16657	1984	36
21.10	Bristol import increase towards Chippenham	3786	1	1
21.11	Devizes resilience: Calne to Devizes new transfer	380	14	0
21.12	Pewsey resilience II	1038	388	6
21.13	Salisbury to Amesbury to Tidworth Transfer	6011	414	8
21.14	Amesbury to Tidworth transfer	2332	1767	29
22.04	Weymouth Source Improvements	359	61	1
23.01	Yeovil Reservoir peak capacity	151	0	0
25.01	Mendips to Stour	31388	363	8
25.03	Grid reinforcements - Wylye valley	8188	442	9
25.04	South Grid Resilience	23616	1086	23
25.05	North Grid to South Grid reinforcements	16607	1536	28
26.17	Reinstatement of mothballed sources - West Dorchester	2940	456	8
27.04	Under-utilised licence - Wimborne Minster	215	0	0
30.02	Pump Storage - Quantock Reservoir	513	72	1
31.02	Raising Dams - Yeovil Reservoir	859	27	1
32.03	New Reservoir - Yeovil	60411	3915	75
32.13	New Reservoir - Dorset Frome	16010	2167	38
32.24	New Reservoir - Parret	19445	2209	39
32.36	New Reservoir - Bristol Avon	23031	2693	48
33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	5592	1628	27

34.08	Groundwater - Hampshire Avon I	14141	3019	51
34.09	Groundwater - Hampshire Avon II	3710	1323	24
34.10	Amesbury boreholes	2250	526	10
34.11	West Salisbury Boreholes	4158	2039	33
36.02	Desalination: North Coast Bristol Water - Avonmouth	67844	8014	142
37.05	Water recycling - Bridgwater Reservoir	1989	299	5
37.06	Water recycling - Quantock Reservoir	3003	628	11
37.07	Water recycling - North Somerset Non Household	3961	317	6
37.10	Water recycling - Taunton Canal	1873	316	5
38.01	Underutilised licence due to water quality: Purbeck	1190	438	7
38.04	Under-utilised licence - Mid Dorset	63	51	1
38.06	Under-utilised licence - Mid Stour II	138	0	0
38.11	Under-utilised licence - East Dorchester Source	275	0	0
38.12	Treatment improvements - East Weymouth Source	66	225	4
39.01	Under-utilised licence - North East Bath	358	0	0
39.02	Under-utilised Licence - North Warminster	111	77	1
41.01	Drought Permit - Stour catchment	0	0	0
41.06	Drought Permit - Bride catchment	0	0	0
52.02	Poole Water Recycling and Transfer – Stour use 50%	9402	285	7
52.03	Poole Water Recycling and Transfer – Stour use 100%	9402	1865	9
54.01	Mendips to Grid	16818	717	6
54.03	Mendips to Trowbridge	26471	1446	29
54.04	Mendips to Grid and Trowbridge	43408	1980	41

54.05	Mendips to Stour - 50% capacity	16130	191	4
54.06	Mendips to Grid - 50% capacity	14017	191	4
54.07	Mendips to Trowbridge - 50% capacity	15065	535	12
54.08	Mendips to Grid and Trowbridge - 50% capacity	29082	1542	31
55.01	CALM main upgrade and reversal - 10Ml/d	13772	895	18
55.03	South Grid Resilience - 8Ml/d	11920	345	8
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	10526	289	7
55.09	Trowbridge to Devizes	6193	278	6
55.10	Trowbridge to Market Lavington	4446	214	1
55.11	Trowbridge to North Warminster	2240	121	1
55.12	Yeovil to Dorchester - 7Ml/d	10295	326	8
56.01	West Salisbury Boreholes - 7Ml/d	2909	1447	24
58.01	Bristol Bulk Import - 15Ml/d	20667	196	8
59.01	Mere Stream Support	53	16	13
70.01	Bristol Import and onwards transfer I	6544	178	5
70.02	Bristol Import and onwards transfer II	7582	567	30
70.03	Bristol Import and onwards transfer III	33545	809	33
70.04	Bristol Import and onwards transfer IV	27353	532	24
70.05	Bristol Import and onwards transfer V	43884	3155	152
70.06	Increased Reservoir Capacity and East Transfer	21626	1839	5
70.07	Hampshire Avon Boreholes and Transfer	12501	4221	112

4.4 Feasible Options Environmental Assessment

Within the WRMP process there is a requirement to consider a number of aspects of environmental legislation, and our consultants Wood undertook this work to ensure we complied with all legislation. Key pieces of legislation included (amongst others) were:

- Environmental Assessment of Plans and Programmes Regulations 2004
- Conservation of Habitats and Species Regulations 2017
- Environment (Water Framework Directive) (England and Wales) Regulations 2017
- Water Supply (Water Quality) Regulations 2016

- Wildlife and Countryside Act 1981
- Countryside and Rights of Way Act 2000
- Natural Environment and Rural Communities Act 2006
- Invasive Alien Species (Enforcement and Permitting) Order 2019
- Marine and Coastal Access Act (2009)

4.4.1 Strategic Environmental Assessments (SEA's)

We undertook a review to determine if our WRMP was subject to SEA requirements, and determined that it was. There is a separate Environmental Report which describes the process for SEA in more detail.

In summary, all the Feasible Options were assessed against the 13 SEA objectives, as summarised in Table 4-3.

Table 4-3: SEA objectives incorporated into the SEA assessment

Topic	Proposed Objective
Biodiversity, Flora and Fauna	1. To protect, restore and enhance biodiversity, including designated sites of nature conservation interest, protected habitats and species, enhance ecosystem services and resilience and deliver a net biodiversity gain.
Soils, Land Use and Geology	2. To protect and enhance soil quantity, quality and functionality and geodiversity and contribute to the sustainable use of land.
Water – Quantity and Quality	3. To maintain, protect and enhance surface and ground water resource levels, flows and quality
Water – Flood Risk	4. To reduce or manage flood risk.
Air	5. To minimise emissions of pollutant gases and particulates and enhance air quality.
Climatic Factors	6. To reduce embodied and operational greenhouse gas emissions.
	7. To adapt and improve resilience to the threats of climate change.
Population	8. To promote a sustainable economy and maintain and enhance the economic and social well-being of local communities.
Human Health	9. To protect and enhance human health and well-being.
Material Assets - Water Resources	10. To promote and enhance the sustainable and efficient use of resilient water resources.
Material Assets – Waste and Resource Use	11. To minimise waste, promote resource efficiency and move towards a circular economy.
Cultural Heritage	12. To conserve and enhance the historic environment including the significance of heritage assets and their settings and archaeologically important sites.
Landscape	13. To conserve, protect and enhance landscape, seascape and townscape character and visual amenity.

Further details of the key economic, social and environmental issues which are relevant to the WRMP planning process are shown under the headings below.

Biodiversity

The biodiversity assessments evaluated the impact of each option upon international and national protected areas, including RAMSAR, SAC, SPA, SSSI, Marine Conservation Zones, National Nature Reserves and Local Nature Reserves. Where feasibly possible, pipeline routes had been selected by HR Wallingford to avoid dissecting these designated areas, with construction techniques chosen to minimise impacts as much as possible.

Geology, Land-Use and Soils

Our supply area is dominated by agricultural land use types (73%), followed by forest, open land and water (17%). The assessments evaluated the impact of each option upon the soil or land-use type that their construction may disturb or alter, ensuring that we avoid damage to geodiversity and where possible enhance sites designated for geological interest.
The assessments into geology, land-use and soils evaluated the impact of each option upon different types of land and soil. The Agricultural Land Classification System (ALCS) developed by Defra provided a method for assessing the quality of farmland, dividing it into five categories as well as non-agricultural and urban typologies.

Water

The status of water bodies was assessed through a range of legislation, of which the most prominent is the Water Framework Directive (WFD). Various programmes and plans, such as River Basin Management Plans (RBMP) and WINEP, have been set up to ensure that water bodies are protected from abstraction, pollution and modifications. The assessments determined the impacts of each option upon water bodies, ensuring that the quantity and quality of resources are maintained, that they do not increase flood risks and that they maintain the resilience of the water environment to the effects of climate change.

Air Quality

Ensuring good air quality is key to public and environmental health. Defra's 2019 Clean Air Strategy sets out proposals and targets for air pollution. Each option was assessed against the baseline to minimise emissions of pollutant gases and particulates and enhancing air quality.

Climate Change

Climate change is caused by greenhouse gas emissions, which include carbon dioxide (CO_2). Carbon emissions and contributions to the atmosphere arise from construction, through the production of materials and the machinery used to operate our water supply assets as they use energy to run. The options were assessed to evaluate their greenhouse gas emissions and therefore their contribution to climate change, based on the carbon costing undertaken by Mott McDonald.

Human Environment

Each option was evaluated upon its impact on water supply, affordability, its continuation of providing safe, reliable and resilient water for the general population, as well as tourists, recreational users and industry such as farming.

Material Assets and Resource Use

Producing water requires using resources for abstraction, treatment and distribution. These resources include the water itself, the building materials for the water supply assets, the chemicals required for treatment and the energy required for distribution. The greater the volume of water required by our customer base means the greater the amount of resources and material assets used.

Each option was evaluated upon its impact of decreasing water demand by customers or their efficiency in production and distribution, to maintain a sustainable, reliable, and resilient water supply to our customers.

Cultural Heritage

Heritage assets range from sites and buildings of local historic value to those of high significance, such as World Heritage Sites. Site scheduling and building listing determines the protection levels upon cultural assets. Each option was assessed against their impacts upon heritage assets such as buildings, monuments, features, sites and places, as they should be conserved. This includes areas which are sensitive to the water environment.

Landscape

Landscapes are areas whose character is the result of the action and interaction of natural and or human factors. Landscapes encompass natural, rural, urban and peri-urban land, inland waters and marine areas. Specific landscapes can be classified as National Parks or Areas of Outstanding Natural Beauty. These classifications try to ensure protection and conservation of their natural landscapes and habitats. Each option was assessed against the need to conserve and enhance landscape and seascape character and minimising any adverse impacts upon landscape that may result from water supply options being developed.

For all of the 13 categories, a qualitative scoring system was applied to score each option on a 7 point scale from major/significant positive effect through neutral to major significant negative effect, with an additional category of uncertain to highlight insufficient information of where the assessment score depends on how an option is operated, or its relationship to the objective. For each of the 13 categories, these scores were then turned into a metric value from 0 to 12, with 0 being a major significant negative effect, and 12 being a major significant positive effect.

To summarise across the 13 categories, and create metrics to incorporate within a multi-criteria analysis (See Section 5.5 of the supporting SEA report), a distinction was made between those categories that have non-location effects, and those which have locational effects:

- non-location effects – so effects arising from the type of option/infrastructure required and benefits provided e.g. embodied and operational greenhouse gas emissions,

economic and social well-being (in part of function of capex spend), water resources (yield) and waste and resources used.
- locational effects – constraints affecting the option arising from where the option is proposed and its proximity to sensitive receptors e.g. a designated habitat (biodiversity), a World Heritage Site (Cultural Heritage) or National Park (landscape).

Mitigation to resolve non-location effects (where required) tends to reflect corporate positions e.g. uptake of EV within the vehicle fleet, or when all energy will be renewable/0 carbon and so for the purposes of decision making is less likely to be considered a differentiator. However, mitigation to resolve location effects tend to be bespoke, and can in some cases be difficult to resolve without additional time and resources and poses risks to implementation, which then can challenge the viability of selected options. Within the context then of decision making, it can then be considered as being useful to discriminate between options, as it then highlights those where environmental constraints/risks are greatest.

The following locational effects were considered as being key:
- For construction effects – where the SEA has identified likely significant negative effects for one or more of 1. Biodiversity, 4. Flood risk, 12. Historic Environment and 13. Landscape.
- For operational effects – where the SEA has identified likely significant negative effects for one or more of 1. Biodiversity and 3. Water quality.

Typically, many of the construction effects arising from constraints can be avoided or mitigated through further design changes (such as changes to location of a point of abstraction, or relocating a pipeline route); however, from an operational perspective, if the proposed option has a likely significant effect (LSE) on a European conservation site (an HRA risk), or is considered WFD non-compliant, it is challenging for the option to proceed without further work (such as additional investigations, modelling and consideration of alternatives) and/or fundamental design changes e.g. potentially a reduction in yield.

Whilst it would then be possible to use the outputs to focus on operational effects, it would limit WWSL's consideration of environmental risks to outputs related to the HRA and WFD, rather than other aspects of an option. In consequence, both stages (construction and operation) have been considered to provide WWSL with a rounded appreciation of environmental risks associated with the feasible options.
Where construction and operational negative effects have been identified for the specific SEA objectives, these effects have been converted into a value scale (0 – 6 for each SEA Objective), then added together with a combined value scale for construction of 0 – 24 and for operation of 0 – 12, with the lower the value, the higher the risk associated with the option. For each feasible option, these scores are summarised in Table 4-4.

Table 4-4: Feasible supply option SEA scoring

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Construction (0-24)	Operation (0-12)
18.01	Somerset Spine main upgrade	7	12
18.02	CALM main upgrade and reversal	2	11
18.09	Chippenham to Devizes transfer upgrade	5	12
18.1	West Somerset Reservoirs transfer upgrade	18	11
18.26	Bristol import increase towards Trowbridge	6	12
18.27	Pewsey Resilience I	16	12
18.28	North Bath Resilience	6	10
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	2	5
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	2	12
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	2	12
19.1	Severn-Thames Transfer: multiple receivers at 15Ml/d	2	12
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	2	12
21.06	Yeovil to Dorchester area new transfer	5	8
21.1	Bristol import increase towards Chippenham	2	12
21.11	Devizes resilience: Calne to Devizes new transfer	7	10
21.12	Pewsey resilience II	16	12
21.13	Salisbury to Amesbury to Tidworth Transfer	8	8
21.14	Amesbury to Tidworth transfer	10	8
22.04	Weymouth Source Improvements	19	12
23.01	Yeovil Reservoir peak capacity	15	12
25.01	Mendips to Stour	9	2
25.03	Grid reinforcements - Wylye valley	2	6
25.04	South Grid Resilience	2	7
25.05	North Grid to South Grid reinforcements	2	6
26.17	Reinstatement of mothballed sources - West Dorchester	8	9
27.04	Under-utilised licence - Wimborne Minster	19	8
30.02	Pump Storage - Quantock Reservoir	10	8
31.02	Raising Dams - Yeovil Reservoir	10	10

32.03	New Reservoir - Yeovil	7	6
32.13	New Reservoir - Dorset Frome	6	0
32.24	New Reservoir - Parret	7	5
32.36	New Reservoir - Bristol Avon	8	4
33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	2	0
34.08	Groundwater - Hampshire Avon I	4	6
34.09	Groundwater - Hampshire Avon II	12	6
34.1	Amesbury boreholes	16	6
34.11	West Salisbury Boreholes	14	6
36.02	Desalination: North Coast Bristol Water - Avonmouth	4	6
37.05	Water recycling - Bridgwater Reservoir	14	11
37.06	Water recycling - Quantock Reservoir	12	11
37.07	Water recycling - North Somerset Non Household	14	11
37.1	Water recycling - Taunton Canal	16	0
38.01	Underutilised licence due to water quality: Purbeck	16	11
38.04	Under-utilised licence - Mid Dorset	10	12
38.06	Under-utilised licence - Mid Stour II	18	12
38.11	Under-utilised licence - East Dorchester Source	18	12
38.12	Treatment improvements - East Weymouth Source	14	12
39.01	Under-utilised licence - North East Bath	16	12
39.02	Under-utilised Licence - North Warminster	14	9
41.01	Drought Permit - Stour catchment	24	12
41.06	Drought Permit - Bride catchment	24	10
52.02	Poole Water Recycling and Transfer – Stour use 50%	5	10
52.03	Poole Water Recycling and Transfer – Stour use 100%	5	10
54.01	Mendips to Grid	3	6
54.03	Mendips to Trowbridge	7	5
54.04	Mendips to Grid and Trowbridge	3	1
54.05	Mendips to Stour - 50% capacity	7	1
54.06	Mendips to Grid - 50% capacity	3	1

54.07	Mendips to Trowbridge - 50% capacity	7	1
54.08	Mendips to Grid and Trowbridge - 50% capacity	3	1
55.01	CALM main upgrade and reversal - 10Ml/d	2	12
55.03	South Grid Resilience - 8Ml/d	4	6
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	2	6
55.09	Trowbridge to Devizes	8	6
55.1	Trowbridge to Market Lavington	13	11
55.11	Trowbridge to North Warminster	12	11
55.12	Yeovil to Dorchester - 7Ml/d	3	8
56.01	West Salisbury Boreholes - 7Ml/d	10	6
58.01	Bristol Bulk Import - 15Ml/d	2	12
59.01	Mere Stream Support	10	12
70.01	Bristol Import and onwards transfer I	3	12
70.02	Bristol Import and onwards transfer II	3	12
70.03	Bristol Import and onwards transfer III	2	11
70.04	Bristol Import and onwards transfer IV	2	11
70.05	Bristol Import and onwards transfer V	2	5
70.06	Increased Reservoir Capacity and East Transfer	3	11
70.07	Hampshire Avon Boreholes and Transfer	6	6

4.4.2 Habitat Regulation Assessments (HRA's)

Water company WRMPs are subject to the provisions of Regulation 631 of the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations'). The water company has a statutory duty to prepare a WRMP and is therefore the Competent Authority for the HRA of that plan.

Regulation 63 essentially provides a test that the final plan must pass; there is no statutory requirement for HRA to be undertaken on draft plans or similar developmental stages, however, as with SEA, it is accepted best-practice for the HRA of WRMPs to be run as an iterative process alongside plan development to ensure that potential effects on European sites can be identified at an early stage and factored into the selection of options. This was the approach that Wood undertook for this WRMP, and is summarised in Figure 4-9:

Figure 4-9: Stages of the Habitat Regulation Assessment

Box 1 – Stages of HRA

Stage 1 – Screening or 'Test of significance'

This stage identifies the likely effects of a project or plan on a European site, either alone or 'in combination' with other projects or plans, and considers whether these effects are likely to be significant. The 'screening' test or 'test of significance' is a low bar, intended as a trigger rather than a threshold test: a plan should be considered 'likely' to have an effect if the competent authority is unable (on the basis of objective information) to exclude the possibility that the plan or project could have significant effects on any European site, either alone or in combination with other plans or projects; an effect will be 'significant' simply if it could undermine the site's conservation objectives. Note that mitigation measures should not be taken into account at the 'screening' stage, in accordance with the **People over Wind** (Court of Justice of the European Union (ECJ) Case C-323/17); this reinforces the idea of screening as a 'low bar' and makes 'appropriate assessments' more common.

Stage 2 – Appropriate Assessment (including the 'Integrity test')

An 'appropriate assessment' (if required) involves a closer examination of the plan or project where the effects on relevant European sites are significant or uncertain, to determine whether any sites will be subject to 'adverse effects on integrity' if the plan or project is given effect. The scope of any 'appropriate assessment' stage is not set, and the assessments will not be extremely detailed in every case (particularly if mitigation is clearly available, achievable, and likely to be effective). The assessments must be 'appropriate' to the effects and proposal being considered, and sufficient to ensure that there is no reasonable doubt that adverse effects on site integrity will not occur (or sufficient for those effects to be appropriately quantified should Stages 3 and 4 be required).

Stage 3 – Assessment of Alternative Solutions

Where adverse effects remain after the inclusion of mitigation, Stage 3 examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of European sites. A plan or project that has adverse effects on the integrity of a European site cannot be permitted if alternative solutions are available, except for imperative reasons of overriding public interest (IROPI; see Stage 4).

Stage 4 – Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain

This stage assesses compensatory measures where it is deemed that there are no alternatives that have no or lesser adverse effects on European sites, and the project or plan should proceed for imperative reasons of overriding public interest (IROPI). The EC guidance does not deal with the assessment of IROPI.

Approach Overview

The HRA process included the following key steps:

- An initial review of the supply-side feasible options, to assist in selection of preferred options. This applied the normal principles and practices associated with 'HRA screening' but took into account of the deliverability of the options including potential mitigation opportunities.
- A formal assessment of the constrained options and preferred programme of options against the provisions of Regulation 63, comprising 'screening' and an 'appropriate assessment'.

For each step, the assessments identified the location and the anticipated outcomes of each option based on the option template. GIS was used to identify all European sites within 20km of any physical infrastructure associated with an option, with sites beyond this considered where reasonable impact pathways are present, based on the scheme description (for example, receptors over 20km downstream of new or modified abstractions). This is a suitably precautionary approach that has important advantages due to the number of feasible options and the benefits of a consistent approach.

The possible effects of each option on European sites and their interest features were then assessed, based on:

- the anticipated operation of each option and predicted zone of any hydrological influence.
- any predicted construction works required for each option;
- the European site interest features and their sensitivities; and,
- the exposure of the site or features to the likely effects of the option (i.e., presence of reasonable impact pathways, taking into account species mobility and functional habitats).

Data collection

Data on the options was provided in the options template, including the likely outcomes (design yields/capacities); the scheme requirements; the type and indicative location of any works; and an outline of how the option would function. The option information was used to identify the 'zone of environmental influence' of each option, essentially the area within which environmental changes as a result of the option implementation are likely to occur in the absence of mitigation.

For the review of the feasible options, data on the European sites and their interest features was initially collected from the Joint Nature Conservation Committee (JNCC), Natural Resources Wales (NRW) and Natural England (NE) websites.

These datasets included information on the attributes of the European sites that contribute to and define their integrity, current conservation status and the specific sensitivities of the site, notably:

- the site boundaries and the boundaries of the component SSSIs;
- the conservation objectives;
- the condition, vulnerabilities and sensitivities of the sites and their interest features;
- the current pressures and threats for the sites;
- and the approximate locations of the interest features within each site (if reported); and designated or non-designated 'functional habitats' (if identified).

Review of Feasible Supply-Side Options

The review of the feasible options had two main purposes:

- It helped inform our selection of constrained options by identifying higher-risk options (from an HRA compliance perspective);
- And it identified those options that would likely require an 'appropriate assessment'.

The review considered implementation (construction etc) and operational effects and, where appropriate to the option, decommissioning. This process is detailed in accompanying Environmental reports by Wood.

Preferred Options / Preferred Programme assessment

The preferred options assessment is essentially the core component of the 'final' HRA. It employs the assessment principles used for the feasible option review with the addition of an 'in combination' assessment (see below) and any additional investigations considered appropriate. For each option, the constrained options assessment comprised of:

- a formal 'screening' of European sites to identify those sites and features where there will self-evidently be 'no effect' or 'no likely significant effects' due to the option, and those where significant effects are likely or uncertain; and
- an 'appropriate assessment' of any options where significant effects cannot be excluded.

Note that the 'low-bar' principle was used for the screening of the preferred options; any reasonable impact pathways identified are investigated further in an appropriate assessment rather than through a more detailed 'secondary screening' or similar. Consequently, the appropriate assessments are 'appropriate' to the nature of the WRMP, the option under consideration, and the scale and likelihood of any effects.

Table 4-5 summarises the HRA assessments for the supply options.

Table 4-5: Summary of HR Assessments for Supply Options

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Option type defined list	HRA Construction	HRA Operation
18.01	Somerset Spine main upgrade	Internal potable transfer	Uncertain	Negligible
18.02	CALM main upgrade and reversal	Internal potable transfer	Low	Uncertain
18.09	Devizes resilience: Chippenham to Devizes transfer upgrade	Internal potable transfer	Low	Negligible
18.1	West Somerset Reservoirs transfer upgrade	Network Upgrade	Low	Uncertain
18.26	Bristol import increase towards Trowbridge	Internal potable transfer	Low	Uncertain
18.27	Pewsey Resilience I	Network Upgrade	Low	Negligible
18.28	North Bath Resilience	Network Upgrade	Negligible	Low
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	External raw transfers	Low	Uncertain
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	External raw transfers	Low	Uncertain
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	External raw transfers	Low	Uncertain
19.1	Severn-Thames Transfer: multiple receivers at 15Ml/d	External raw transfers	Low	Uncertain
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	External raw transfers	Low	Uncertain
21.06	Yeovil to Dorchester area new transfer	Internal potable transfer	Uncertain	Uncertain

21.1	Bristol import increase towards Chippenham	Internal potable transfer	Low	Uncertain
21.11	Devizes resilience: Calne to Devizes new transfer	Internal potable transfer	Negligible	Low
21.12	Pewsey resilience II	Internal potable transfer	Low	Uncertain
21.13	Salisbury to Amesbury to Tidworth Transfer	Internal potable transfer	Low	Uncertain
21.14	Amesbury to Tidworth transfer	Internal potable transfer	Low	Uncertain
22.04	Weymouth Source Improvements	WTC capacity increase	Negligible	Negligible
23.01	Yeovil Reservoir peak capacity	Reservoir - increase output	Negligible	Negligible
25.01	Mendips to Stour	Mendip Quarries from 2025- see WRO design	High	High
25.03	Grid reinforcements - Wylye valley	Internal potable transfer	High	High
25.04	South Grid Resilience	Internal potable transfer	High	Uncertain
25.05	North Grid to South Grid reinforcements	Internal potable transfer	High	High
26.17	Reinstatement of mothballed sources - West Dorchester	Mothballed or unused site reinstatement	Low	Low
27.04	Under-utilised licence - Wimborne Minster	WTC capacity increase	Negligible	Low
30.02	Pump Storage - Quantock Reservoir	Reservoir - new pump storage	Low	Low
31.02	Raising Dams - Yeovil Reservoir	Reservoir - enlargement	Low	Negligible
32.03	New Reservoir - Yeovil	Reservoir - new site	Uncertain	Low
32.13	New Reservoir - Dorset Frome	Reservoir - new site	High	High
32.24	New Reservoir - Parret	Reservoir - new site	Low	Low
32.36	New Reservoir - Bristol Avon	Reservoir - new site	Low	Low
33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	Aquifer storage & recovery	High	High
34.08	Groundwater - Hampshire Avon I	New source - groundwater	Low	Uncertain
34.09	Groundwater - Hampshire Avon II	New source - groundwater	Low	Uncertain
34.1	Amesbury boreholes	New source - groundwater	Low	Uncertain
34.11	West Salisbury Boreholes	New source - groundwater	Low	Uncertain
36.02	Desalination: North Coast Bristol Water - Avonmouth	Desalination	High	High
37.05	Water recycling - Bridgwater Reservoir	Water recycling	Low	Uncertain
37.06	Water recycling - Quantock Reservoir	Water recycling	Low	Uncertain
37.07	Water recycling - North Somerset Non Household	Water recycling	Low	Uncertain

37.1	Water recycling - Taunton Canal	Water recycling	Low	High
38.01	Underutilised licence due to water quality: Purbeck	Licence utilisation - improved treatment	Low	Low
38.04	Under-utilised licence - Mid Dorset	Licence utilisation - improved treatment	Negligible	Negligible
38.06	Under-utilised licence - Mid Stour II	Licence utilisation - improved treatment	Negligible	Negligible
38.11	Under-utilised licence - East Dorchester Source	Licence utilisation - improved treatment	Negligible	Negligible
38.12	Treatment improvements - East Weymouth Source	WTC capacity increase	Low	Negligible
39.01	Under-utilised licence - North East Bath	Licence utilisation	Negligible	Negligible
39.02	Under-utilised Licence - North Warminster	Licence utilisation	Low	Uncertain
41.01	Drought Permit - Stour catchment	NA	NA	NA
41.06	Drought Permit - Bride catchment	NA	NA	NA
52.02	Poole Water Recycling and Transfer – Stour use 50%	Poole - lead from 2025 - see SRO design	Low	Uncertain
52.03	Poole Water Recycling and Transfer – Stour use 100%	Poole - lead from 2025 - see SRO design	Low	Uncertain
54.01	Mendips to Grid	Mendips from 2025-see WRO design	High	High
54.03	Mendips to Trowbridge	Mendips from 2025-see WRO design	High	High
54.04	Mendips to Grid and Trowbridge	Mendips from 2025-see WRO design	High	High
54.05	Mendips to Stour - 50% capacity	Mendips from 2025-see WRO design	High	High
54.06	Mendips to Grid - 50% capacity	Mendips from 2025-see WRO design	High	High
54.07	Mendips to Trowbridge - 50% capacity	Mendips from 2025-see WRO design	High	High
54.08	Mendips to Grid and Trowbridge - 50% capacity	Mendips from 2025-see WRO design	High	High
55.01	CALM main upgrade and reversal - 10Ml/d	Internal potable transfer	low	uncertain
55.03	South Grid Resilience - 8Ml/d	Internal potable transfer	High	Uncertain
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	Internal potable transfer	High	Uncertain
55.09	Trowbridge to Devizes	Internal potable transfer	Low	Uncertain
55.1	Trowbridge to Market Lavington	Internal potable transfer	Low	Negligible
55.11	Trowbridge to North Warminster	Internal potable transfer	Low	Negligible
55.12	Yeovil to Dorchester - 7Ml/d	Internal potable transfer	Uncertain	Uncertain
56.01	West Salisbury Boreholes - 7Ml/d	New source - groundwater	Low	Uncertain

58.01	Bristol Bulk Import - 15Ml/d	Internal potable transfer	Low	Negligible
59.01	Mere Stream Support	Mere Stream Support	Negligible	Negligible
70.01	Bristol Import and onwards transfer I	Internal potable transfer	Low	Uncertain
70.02	Bristol Import and onwards transfer II	Internal potable transfer	Low	Uncertain
70.03	Bristol Import and onwards transfer III	Internal potable transfer	Low	Uncertain
70.04	Bristol Import and onwards transfer IV	Internal potable transfer	Low	Negligible
70.05	Bristol Import and onwards transfer V	Internal potable transfer	High	High
70.06	Increased Reservoir Capacity and East Transfer	Internal potable transfer	Low	Uncertain
70.07	Hampshire Avon Boreholes and Transfer	New source - groundwater	Low	Uncertain

4.4.3 Biodiversity Net-Gain and Natural Capital assessments

Biodiversity Net-Gain and Natural Capital assessments were undertaken by WSP consultants. A more detailed description of the work undertaken can be found in the supporting report: Water Resources Management Plan 2024: Biodiversity Net Gain and Natural Capital Assessment.

Biodiversity Net Gain Assessment Method

Initial BNG calculations were undertaken on all feasible options, using the Biodiversity Metric V3.1. The calculations used national habitat datasets mapped over the Option boundaries, within a Geographical Information System (GIS). This provided a high-level estimate of each Option's BNG requirements, which was used to assign a Red-Amber-Green (RAG) score so that indicative BNG requirements for all options could be compared.

Baseline habitat extractions

Aerial imagery combined with Google Street View was utilised to provide a high-level assessment of the new assets needed for each option.

To extract the habitat baseline, CORINE 2018 land cover vector data was utilised. The CORINE dataset is an open-source land cover product developed by the Copernicus Land Monitoring Service (CLMS). The dataset provides continuous classified land cover parcels across the UK with a minimum mapping unit of 25 hectares and a minimum mapping width of 100 metres. A total of 44 land cover classes are contained within the dataset, spanning across 5 main broader land cover/use categories (Artificial surfaces, Agriculture, Forests and seminatural areas, Wetlands and Water).

Ancient Woodland

The option extents were overlaid with Ancient Woodland from the open-source Natural England Inventory dataset. Options with Ancient Woodland within the extent were excluded from the BNG assessment. This was on the assumption that the option would result in loss

of Ancient Woodland and, as Ancient Woodland is an irreplaceable habitat and any loss is permanent, a BNG outcome is not possible.

Processing the BNG assessment

CORINE habitats were translated into the most appropriate habitat type. The condition score of each CORINE habitat was assigned.

For each option, the habitat data was entered into the Defra Biodiversity Metric V3.1. Then, the total Biodiversity Unit score was calculated for all habitats within the footprint of each option, which gave the total number of Area-Based Habitat Units (ABHU) for each option. Different habitats generated different numbers of ABHU and so the total number of ABHU per hectare was calculated for a standardised comparison between all options.

The assessment assumed that all habitat within the Option footprint will be lost. As it was not possible to consistently determine elements within the options, temporary and permanent losses were not considered separately. Therefore, the total ABHU for each option was compiled, representing the worst-case deficit of ABHU from which BNG would be required.

The results were scored as follows:

- The total number of ABHU for the option was converted to a more appropriate scale where scores of less than 100 scored an equivalent of 1; scores of 101-200 were given a score of 2, and scores of greater than 200 were given a score of 3. In addition, ABHU/ha scores were adjusted as follows: where less than 3, a score of 1 was given; between 3.01 and 6 a score of 2 was given; and greater than 6 scored 3.
- The scores were summed to give the overall Red/Amber/Green (RAG) score for BNG with a higher number indicating a greater negative impact. These were colour-coded as <3: GREEN; 4: AMBER; and >5: RED.

In addition, the biodiversity metric calculation of each option was reviewed to identify the CORINE habitats within the option and provide commentary on the context for BNG. For example, there were options that were relatively large in extent with an overall RAG score of 4. These options only contained Cropland, which is a habitat that in itself has a low ABHU per hectare, but the large size of the option meant that it had a high total number of ABHU. Whereas a smaller option with a lower total number of ABHU might contain Woodland or Ponds, however both habitats have a high ABHU per hectare and hence the option is likely to be more ecologically valuable.

Not all options have BNG assessments. This results from the initial assessment where if a scheme was in close proximity to ancient woodlands it was not possible to provide a net gain.

The resultant RAG scores across schemes for the BNG assessment, alongside qualitative comments on the analysis, are shown in Table 4-6. The lower the score, the better the outcome for Bio-diversity Net Gain.

Table 4-6 BNG calculation RAG scores for feasible options

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Overall BNG RAG score	Option Comments
18.01	Somerset Spine main upgrade	4	A relatively large Option which boosts the ABHU numbers; within the Option extent is mostly Cropland (which as a low ABHU) and hard-standing, as well as a small area of woodland (with high ABHU)
18.02	CALM main upgrade and reversal	3	Long pipeline crossing predominantly cropland, with some neutral grassland and mixed woodland (including ancient woodland)
18.09	Devizes resilience: Chippenham to Devizes transfer upgrade	2	Mainly Cropland with smaller areas of woodland (with high ABHU)
18.1	West Somerset Reservoirs transfer upgrade	2	Only Cropland mapped within the Option extent
18.26	Bristol import increase towards Trowbridge	2	New pipeline (and associated works) crossing predominantly cropland, with some developed land and broadleaved woodland (including ancient woodland)
18.27	Pewsey Resilience I	2	Only Cropland mapped within the Option extent
18.28	North Bath Resilience	0	Mapping shows large blocks of developed land, cropland and broadleaved woodland covered. However, scheme description suggests minimal, if any, disturbance to habitats. Results have therefore been overwritten with zeroes
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	5	Long new pipelines and includes existing area of SWW Reservoir. Extensive areas of cropland developed land, woodland (broadleaved and coniferous, including ancient woodland) and lakes covered, and some lowland heathland. From the scheme description it looks as though the lake extent will be unmodified, but it has been included in here for consistency with the GIS
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	4	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	4	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)

19.1	Severn-Thames Transfer: multiple receivers at 15Ml/d	4	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	4	Long pipeline and new storage reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland)
21.06	Yeovil to Dorchester area new transfer	4	Largely cereal crops, with some broadleaved woodland. 34km of pipeline from Yeovil to Dorchester, plus storage reservoirs and pumping stations. Majority of impact will be temporary.
21.1	Bristol import increase towards Chippenham	2	New pipeline and new storage reservoir. Covers developed land, cropland and some broadleaved woodland (including ancient woodland)
21.11	Devizes resilience: Calne to Devizes new transfer	2	Mainly Cropland with a small area of other neutral grassland (with a higher ABHU)
21.12	Pewsey resilience II	2	Only Cropland mapped within the Option extent
21.13	Salisbury to Amesbury to Tidworth Transfer	2	Largely cereal crops. 14km pipeline from Salisbury to Amesbury, with service reservoirs and pumping station. Majority of impact will be temporary.
21.14	Amesbury to Tidworth transfer	2	Predominantly cereal crops and developed land, with some mixed woodland and neutral grassland 11km pipeline from Amesbury to Tidworth, with pumping station. Majority of impact will be temporary.
22.04	Weymouth Source Improvements	2	Only Cropland mapped within the Option extent
23.01	Yeovil Reservoir peak capacity	4	Only a small Pond area although the Pond itself has a high ABHU
25.01	Mendips to Stour	4	Includes area of Mendips reservoir, and new pipeline. Predominantly developed land (this is the extent of Mendips Quarry) and cropland, with some broadleaved woodland (including ancient woodland)
25.03	Grid reinforcements - Wylye valley	3	Mainly Cropland with some hard-standing; also a small Pond that has a high ABHU
25.04	South Grid Resilience	4	Includes new pipelines and service reservoirs. Predominantly cropland, with some woodland (broadleaved, mixed and coniferous, including ancient woodland), lowland heathland and developed land

25.05	North Grid to South Grid reinforcements	3	Includes new pipelines and service reservoirs. Predominantly cropland, with some woodland (broadleaved and mixed, including ancient woodland) and developed land
26.17	Reinstatement of mothballed sources - West Dorchester	3	Mainly Cropland with some hard-standing; also an area of woodland that has a high ABHU
27.04	Under-utilised licence - Wimborne Minster	2	Only Cropland mapped within the Option extent
30.02	Pump Storage - Quantock Reservoir	2	Only Cropland mapped within the Option extent
31.02	Raising Dams - Yeovil Reservoir	6	Approx half of the Option extent is covered by Lakes / Ponds which have high ABHU and the remainder is Cropland with low ABHU
32.03	New Reservoir - Yeovil	4	Mostly Cropland within the Option extent with a small area of coniferous woodland
32.13	New Reservoir - Dorset Frome	3	Mainly Cropland (with a low ABHU) with a small area of woodland
32.24	New Reservoir - Parret	4	Only Cropland mapped within the Option extent (Cropland has a low ABHU but the Option extent is relatively large which boosts the RAG score)
32.36	New Reservoir - Bristol Avon	3	Reservoir near Bristol Avon, with new pipelines and WTW. Almost all cropland, with some broadleaved woodland (including ancient woodland)
33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	4	Includes ASR, pipelines (including discharge pipeline to Poole Harbour), treatment works and new storage reservoir. Crosses cropland, mixed woodland (including ancient woodland), and high distinctiveness habitats including lowland heathland and saltmarsh
34.08	Groundwater - Hampshire Avon I	2	New boreholes, treatment works, pipeline, service reservoir. Predominantly cropland, and areas of broadleaved woodland (including ancient woodland) and developed land
34.09	Groundwater - Hampshire Avon II	2	Mainly Cropland (with a low ABHU) with some hard standing
34.1	Amesbury boreholes	2	Mainly Cropland (with a low ABHU) with some hard standing
34.11	West Salisbury Boreholes	2	Mostly Cropland with a low ABHU; a small area of woodland with a high ABHU and some hard-standing

36.02	Desalination: North Coast Bristol Water - Avonmouth	4	Desalination plans with new pipelines, upgraded to pumping stations and new service reservoirs. Predominantly cropland and developed land, with some broadleaved woodland (including ancient woodland) and saltmarsh (high distinctiveness habitat)
37.05	Water recycling - Bridgwater Reservoir	6	Over half of the Option extent is Lakes / Ponds that scrore high ABHU; the rest of the Option is Cropland with a low ABHU
37.06	Water recycling - Quantock Reservoir	3	Only Cropland mapped within the Option extent (Cropland has a low ABHU)
37.07	Water recycling - North Somerset Non Household	3	Only Cropland and hard-standing mapped within the Option extent (Cropland has a low ABHU)
37.1	Water recycling - Taunton Canal	3	Only Cropland and hard-standing mapped within the Option extent (Cropland has a low ABHU)
38.01	Underutilised licence due to water quality: Purbeck	2	Only Cropland mapped within the Option extent (Cropland has a low ABHU)
38.04	Under-utilised licence - Mid Dorset	2	Small area of Cropland with some hard-standing (Cropland has a low ABHU)
38.06	Under-utilised licence - Mid Stour II	2	Only Cropland mapped within the Option extent (Cropland has a low ABHU)
38.11	Under-utilised licence - East Dorchester Source	4	Only woodland mapped with the Option extent; woodland has a high ABHU
38.12	Treatment improvements - East Weymouth Source	2	Very small area of Cropland with low ABHU and some hard-standing; too small to register in the Biodiversity metric
39.01	Under-utilised licence - North East Bath	2	Small area of Cropland with low ABHU
39.02	Under-utilised Licence - North Warminster	2	Very small area of Cropland with low ABHU; too small to register in the Biodiversity metric
41.01	Drought Permit - Stour catchment	NA	NA
41.06	Drought Permit - Bride catchment	NA	NA
52.02	Poole Water Recycling and Transfer – Stour use 50%	2	Although an overall low AHBU, within this Option extent are small areas of high ABHU scoring habitats of Heathland and Lakes / Ponds
52.03	Poole Water Recycling and Transfer – Stour use 100%	2	Although an overall low AHBU, within this Option extent are small areas of high ABHU scoring habitats of Heathland and Lakes / Ponds

54.01	Mendips to Grid	4	Predominantly developed land and cereal crops, with a small amount of broadleaved woodland This option is only for the transfer from Mendips to service reservoir in a service reservoir in the Wylye Valley, but includes the whole area of the reservoir (as agreed with WWSL). Therefore the areas and associated losses shown here are greater than for the transfer alone. Impacts associated with the transfer will be largely temporary.
54.03	Mendips to Trowbridge	4	Predominantly developed land and cereal crops, but with some woodland This option is only for the transfer from Mendips to service reservoir near Trowbridge but includes the whole area of the reservoir (as agreed with WWSL). Therefore, the areas and associated losses shown here are greater than for the transfer alone. Impacts associated with the transfer will be largely temporary.
54.04	Mendips to Grid and Trowbridge	4	A combination of 54_01 and 54_03
54.05	Mendips to Stour - 50% capacity	4	From a BNG perspective, this option is the same as 25_01
54.06	Mendips to Grid - 50% capacity	4	From a BNG perspective, this option is the same as 54_01
54.07	Mendips to Trowbridge - 50% capacity	4	From a BNG perspective, this option is the same as 54_03
54.08	Mendips to Grid and Trowbridge - 50% capacity	4	A combination of 54_06 and 54_07
55.01	CALM main upgrade and reversal - 10Ml/d	4	Predominantly cereal crops, with some neutral grassland and broadleaved woodland. New 43km main, plus booster station. Majority of impact will be temporary.
55.03	South Grid Resilience - 8Ml/d	5	Predominantly arable land, but also woodland (mixed, coniferous and broadleaved) and lowland heathland. New mains and service reservoirs
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	4	Predominantly arable land, but also some woodland (mixed and broadleaved). New mains and service reservoirs
55.09	Trowbridge to Devizes	3	Predominantly cereal crops, with a small extent of broadleaved woodland New mains and service reservoirs

55.1	Trowbridge to Market Lavington	2	Predominantly cereal crops. New main, pumping station and service reservoir
55.11	Trowbridge to North Warminster	2	All cereal crops and developed land. New main and pumping station
55.12	Yeovil to Dorchester - 7Ml/d	4	Predominantly cereal crops, with some broadleaved woodland. New pipelines and storage reservoirs
56.01	West Salisbury Boreholes - 7Ml/d	2	Cereal crops, developed land and broadleaved woodland. New boreholes, treatment works, pipeline and storage
58.01	Bristol Bulk Import - 15Ml/d	4	Largely arable land and developed land, with a small amount of broadleaved woodland. Pipeline and new storage at storage reservoirs
59.01	Mere Stream Support	3	Cereal crops and some neutral grassland. Pipeline and permanent infrastructure
70.01	Bristol Import and onwards transfer I	3	A combination of 18_26 and 18_09
70.02	Bristol Import and onwards transfer II	4	A combination of 18_26, 18_09 and 21_12
70.03	Bristol Import and onwards transfer III	4	A combination of 58_01, 55_10, 55_11 and 55_09
70.04	Bristol Import and onwards transfer IV	4	A combination of 58_01, 55_10 and 55_11
70.05	Bristol Import and onwards transfer V	4	A combination of 58_01, 55_10, 55_11, 21_13, 25_03 and 21_14
70.06	Increased Reservoir Capacity and East Transfer	4	A combination of 23_01 and 18_02
70.07	Hampshire Avon Boreholes and Transfer	3	A combination of 21_13, 21_14 and 34_11

Natural Capital Assessment

The approach taken to Natural Capital Assessment was consistent with the WRPG supplementary guidance requirements, and assessment was taken for each ecosystem service:

- **Biodiversity**. Uses results of the BNG calculations and inclusion of ancient woodland
- **Climate regulation**. Was monetised in line with the supplementary guidance
- **Natural hazard regulation**. Was monetised in line with the supplementary guidance and using ENCA (Defra, 2021)
- **Water purification**. Inferred to follow similar trends to climate regulation and natural hazard regulation,
- **Water regulation**. Was accounted for in WFD assessment and therefore not included in NCA to avoid double counting.

The assessment for the NC approach was completed using data sources as recommended by the All Company Working Group environmental assessment guidance for SROs, and the EA Water Resources Supplementary Guidance on Environment and Society in Decision-Making.

In line with the method previously provided to WWSL for use in the MCDA, scores from -3 to 3 have been assigned for each of the:

- magnitude of the ecosystem service delivery
- spatial scale over which the option extends
- temporal scale over which the option extends.

At the feasible options stage, the assessment only considers losses, not gains.

Table 4-7 summarises the Natural Capital Assessments. For Natural Capital, the assessments considered expected habitat loss for three key Ecosystem Services which include Biodiversity, Climate regulation and Natural hazard regulation. Lower scores indicate higher potential Natural Capital losses. NC scores were summed and weighted by temporal and spatial effects with a 0.6 weighting applied to temporal scale as it is considered to have the greatest effect in comparison to spatial effects (0.4 weighting). The higher the score, the better the score and outcome for Natural Capital with zero being the highest.

Table 4-7: Natural Capital Scores

Option ID	Biodiversity	Climate Regulation	Nat Hazard Regulation	Spatial Scale	Temporal	Weighted Score
18.01	-2	-1	-1	-3	-1	-7.2
18.02	-3	-2	-1	-3	-1	-10.8
18.09	-1	-2	-1	-2	-1	-5.6
18.1	-1	-1	-1	-1	-3	-6.6
18.26	-3	-1	-1	-2	-1	-7
18.27	-1	-1	-1	-1	-1	-3
18.28	-3	-3	-2	-1	-3	-17.6
19.03	-3	-2	-1	-3	-1	-10.8
19.06	-3	-2	-1	-3	-1	-10.8
19.07	-3	-2	-1	-3	-1	-10.8
19.1	-3	-2	-1	-3	-1	-10.8
19.11	-3	-2	-1	-3	-1	-10.8
21.06	-3	-2	-1	-3	-1	-10.8
21.1	-3	-2	-2	-2	-1	-9.8
21.11	-1	-1	-1	-2	-1	-4.2

21.12	-1	-1	-1	-2	-1	-4.2
21.13	-1	-1	-1	-2	-1	-4.2
21.14	-1	-1	-1	-2	-1	-4.2
22.04	-1	-1	-1	-1	-3	-6.6
23.01	-2	-1	-1	-1	-3	-8.8
25.01	-3	-1	-1	-3	-1	-9
25.03	-2	-1	-1	-2	-1	-5.6
25.04	-3	-2	-2	-3	-1	-12.6
25.05	-3	-2	-1	-3	-1	-10.8
26.17	-2	-2	-2	-2	-1	-8.4
27.04	-1	-1	-1	-1	-3	-6.6
30.02	-1	-1	-1	-2	-1	-4.2
31.02	-3	-1	-1	-2	-3	-13
32.03	-2	-1	-1	-3	-3	-12
32.13	-2	-2	-1	-2	-3	-13
32.24	-2	-1	-1	-3	-3	-12
32.36	-3	-1	-1	-3	-3	-15
33.01	-3	-2	-2	-2	-1	-9.8
34.08	-3	-2	-2	-2	-1	-9.8
34.09	-1	-1	-1	-2	-1	-4.2
34.1	-1	-1	-1	-2	-1	-4.2
34.11	-1	-2	-2	-2	-1	-7
36.02	-3	-1	-1	-3	-1	-9
37.05	-3	-1	-1	-2	-1	-7
37.06	-2	-1	-1	-2	-1	-5.6
37.07	-2	-1	-1	-2	-1	-5.6
37.1	-2	-1	-1	-2	-1	-5.6
38.01	-1	-1	-1	-1	-1	-3
38.04	-1	-1	-1	-1	-3	-6.6

38.06	-1	-1	-1	-1	-3	-6.6
38.11	-2	-3	-3	-1	-3	-17.6
38.12	-1	-1	-1	-1	-3	-6.6
39.01	-1	-1	-1	-1	-3	-6.6
39.02	-1	-1	-1	-1	-3	-6.6
41.01	0	0	0	0	0	0
41.06	0	0	0	0	0	0
52.02	-1	-1	-1	-2	-1	-4.2
52.03	-1	-1	-1	-2	-1	-4.2
54.01	-3	-1	-1	-3	-3	-15
54.03	-3	-1	-1	-3	-3	-15
54.04	-3	-1	-1	-3	-3	-15
54.05	-3	-1	-1	-3	-3	-15
54.06	-3	-1	-1	-3	-3	-15
54.07	-3	-1	-1	-3	-3	-15
54.08	-3	-1	-1	-3	-3	-15
55.01	-3	-1	-1	-3	-1	-9
55.03	-3	-2	-2	-2	-1	-9.8
55.05	-3	-2	-1	-3	-1	-10.8
55.09	-3	-2	-1	-2	-1	-8.4
55.1	-1	-1	-1	-2	-1	-4.2
55.11	-1	-1	-1	-2	-1	-4.2
55.12	-3	-2	-1	-3	-1	-10.8
56.01	-1	-2	-2	-2	-1	-7
58.01	-3	-1	-1	-3	-1	-9
59.01	-2	-2	-1	-1	-3	-11
70.01	-3	-2	-1	-2	-1	-8.4
70.02	-3	-2	-1	-2	-1	-8.4
70.03	-3	-2	-1	-3	-1	-10.8
70.04	-3	-1	-1	-3	-1	-9
70.05	-3	-1	-1	-3	-1	-9
70.06	-3	-2	-1	-3	-3	-18
70.07	-1	-1	-1	-2	-1	-4.2

4.4.4 Water Framework Directive (WFD) assessments

There is a requirement that our WRMP must deliver actions to meet WFD objectives. A sequential six-stage process for undertaking the WFD compliance assessment was applied. The six[25] sequential steps are:

1. WFD compliance assessment screening: a preliminary assessment of each option element was included in the WRMP feasible list to identify if there is any risk of deterioration in WFD status or risk to achieving WFD objectives. For existing sources, information was used from any previous investigations by the Environment Agency and Wessex Water on the sustainability of the sources, up to their fully licensed abstraction rates. For new resource options this screening step was based on expert judgement taking account of existing available evidence. Where a risk is identified, the option element is subject to the WFD compliance assessment.

2. Element level WFD compliance assessment: For ecological status, this involved an assessment of the likely changes to the supporting hydro-morphology or water quality occurring as a result of the construction or operation of the option element and the possible risks to WFD status of biological elements, at a water body scale. In addition, the potential effects on WFD chemical status and WFD protected areas was assessed.

3. Option level WFD compliance assessment: Where options are selected within the set of programmes, their individual elements were consolidated into options. This includes both consolidating the water body scale WFD compliance assessments of each of the individual elements (from Steps 1 and 2) and considering whether there are cumulative impacts on a water body from the elements that comprise the option.

4. Programme level WFD compliance assessment: This involves assessment of the set of options within each reasonable alternative programme, both alone and in combination with other options within the programme. Each alternative programme will be assessed separately. The alone assessment was a consolidation of the option level assessments from Step 3. That assessment was used to identify where multiple options potentially impact on the same WFD water body, with a re-assessment of the cumulative assessment on that water body, and potentially downstream water bodies where appropriate.

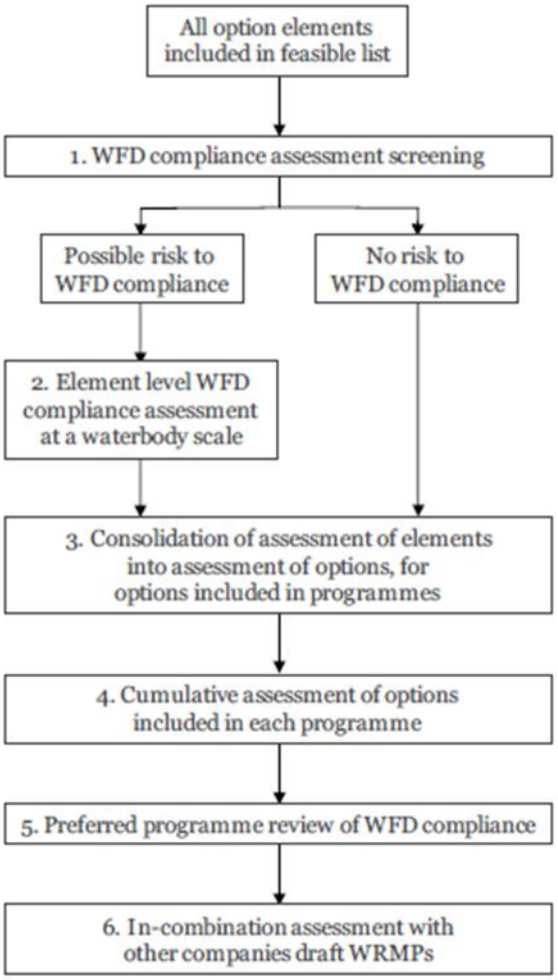
5. Preferred programme WFD compliance statement. This involved a statement of the compliance of the preferred programme against each of the WFD compliance objectives.

6. In-combination assessment of the preferred programme with the latest available information of other water companies developing WRMP24s. An in-combination assessment was included for WRMP24 based on the latest available information, primarily drawn from collaborative work through WCWRG. It is noted that options promoted through WRMP24 may interact with options included within the Wessex Water Drought Plan, with potential changes to the effectiveness of the drought measure or the environmental impact. Where there may be potential changes to the Drought Plan, these would be updated as part of the cycle of Drought Plan updates at the time that the WRMP option is implemented, either by

changing the drought measures or changing the environmental baseline for assessing the environmental effects of the drought measure.

These six sequential steps are shown schematically in Figure 4-10.

Figure 4-10: WRMP WFD compliance assessment steps



For level 1 screening, each element of a scheme was given a level of impact classification, to derive an overall level of impact, as shown in Table 4-8 and Table 4-9. Options with 1 or more Medium or High Impact scores for elements were taken through to Level 2 assessment. For level 2 assessments, further baseline data was gathered to inform expert judgement on the potential spatial and temporal impacts of an option.

Table 4-8: Level of impact assigned to scheme elements

Level of impact	Description of impact	Level 2?
None	No measurable change in the quality or the water environment or the ability for target WFD objectives to be achieved	No
Minor	Impacts from the option when taken on their own have the potential to lead to a minor, localised short-term and fully-reversible effect on	No

Level of impact	Description of impact	Level 2?
	the quality of the water environment that would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.	
Medium	Impacts when taken on their own have the potential to lead to a widespread or prolonged effect on the quality of the water environment that may result in the temporary lowering of WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.	Yes
High	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Impacts have a high risk of preventing target WFD objectives from being achieved.	Yes

Table 4-9: Feasible option WFD assessment result for Level 1 assessment

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Level 1 Result	Level 2
18.01	Somerset Spine main upgrade	Minor	No
18.02	CALM main upgrade and reversal	Minor	No
18.09	Devizes resilience: Chippenham to Devizes transfer upgrade	Minor	No
18.1	West Somerset Reservoirs transfer upgrade	None	No
18.26	Bristol import increase towards Trowbridge	Minor	No
18.27	Pewsey Resilience I	None	No
18.28	North Bath Resilience	None	No
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	High	Yes
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	Minor	No
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	Minor	No
19.1	Severn-Thames Transfer: multiple receivers at 15Ml/d	Minor	No
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	Minor	No
21.06	Yeovil to Dorchester area new transfer	Minor	No
21.1	Bristol import increase towards Chippenham	Minor	No

21.11	Devizes resilience: Calne to Devizes new transfer	None	No
21.12	Pewsey resilience II	None	No
21.13	Salisbury to Amesbury to Tidworth Transfer	Minor	No
21.14	Amesbury to Tidworth transfer	Minor	No
22.04	Weymouth Source Improvements	None	No
23.01	Yeovil Reservoir peak capacity	None	No
25.01	Mendips to Stour	High	Yes
25.03	Grid reinforcements - Wylye valley	Minor	No
25.04	South Grid Resilience	Minor	No
25.05	North Grid to South Grid reinforcements	Minor	No
26.17	Reinstatement of mothballed sources - West Dorchester	Medium	Yes
27.04	Under-utilised licence - Wimborne Minster	Medium	Yes
30.02	Pump Storage - Quantock Reservoir	High	Yes
31.02	Raising Dams - Yeovil Reservoir	High	Yes
32.03	New Reservoir - Yeovil	High	Yes
32.13	New Reservoir - Dorset Frome	High	Yes
32.24	New Reservoir - Parret	High	Yes
32.36	New Reservoir - Bristol Avon	High	Yes
33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	Medium	Yes
34.08	Groundwater - Hampshire Avon I	Medium	Yes
34.09	Groundwater - Hampshire Avon II	Medium	Yes
34.1	Amesbury boreholes	Medium	Yes
34.11	West Salisbury Boreholes	Medium	Yes
36.02	Desalination: North Coast Bristol Water - Avonmouth	Minor	No
37.05	Water recycling - Bridgwater Reservoir	Medium	Yes
37.06	Water recycling - Quantock Reservoir	High	Yes

37.07	Water recycling - North Somerset Non Household	Medium	Yes
37.1	Water recycling - Taunton Canal	Medium	Yes
38.01	Underutilised licence due to water quality: Purbeck	Minor	No
38.04	Under-utilised licence - Mid Dorset	None	No
38.06	Under-utilised licence - Mid Stour II	None	No
38.11	Under-utilised licence - East Dorchester Source	None	No
38.12	Treatment improvements - East Weymouth Source	None	No
39.01	Under-utilised licence - North East Bath	None	No
39.02	Under-utilised Licence - North Warminster	Medium	Yes
41.01	Drought Permit - Stour catchment	Minor	No
41.06	Drought Permit - Bride catchment	Minor	No
52.02	Poole Water Recycling and Transfer – Stour use 50%	Medium	Yes
52.03	Poole Water Recycling and Transfer – Stour use 100%	Medium	Yes
54.01	Mendips to Grid	High	Yes
54.03	Mendips to Trowbridge	High	Yes
54.04	Mendips to Grid and Trowbridge	High	Yes
54.05	Mendips to Stour - 50% capacity	High	Yes
54.06	Mendips to Grid - 50% capacity	High	Yes
54.07	Mendips to Trowbridge - 50% capacity	High	Yes
54.08	Mendips to Grid and Trowbridge - 50% capacity	High	Yes
55.01	CALM main upgrade and reversal - 10Ml/d	Minor	No
55.03	South Grid Resilience - 8Ml/d	Minor	No
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	Minor	No
55.09	Trowbridge to Devizes	Minor	No

55.1	Trowbridge to Market Lavington	Minor	No
55.11	Trowbridge to North Warminster	Minor	No
55.12	Yeovil to Dorchester - 7Ml/d	Minor	No
56.01	West Salisbury Boreholes - 7Ml/d	Medium	Yes
58.01	Bristol Bulk Import - 15Ml/d	Minor	No
59.01	Mere Stream Support	None	No
70.01	Bristol Import and onwards transfer I	None	No
70.02	Bristol Import and onwards transfer II	None	No
70.03	Bristol Import and onwards transfer III	None	No
70.04	Bristol Import and onwards transfer IV	None	No
70.05	Bristol Import and onwards transfer V	None	No
70.06	Increased Reservoir Capacity and East Transfer	None	No
70.07	Hampshire Avon Boreholes and Transfer	Medium	Yes

4.4.5 Invasive Non-Native Species (INNS)

Each supply option was assessed for the risks of Invasive Non-Native Species (INNS), which is the risk of allowing the transfer of an INNS into a catchment where that species does not already exist, such as those outlined in Table 4-10.

Table 4-10: Examples of INNS in Wessex Water's supply area

For security reasons this table has been edited for the version that is published on our website.

INNS species	Location
Signal crayfish	Yeovil Reservoir, Bath Reservoir, Exmoor Reservoir and Lake near Ringwood.
Zebra mussels	Bath Reservoir
Himalayan balsam	Widely spread across the region
New Zealand pigmyweed/stonecrop	Lakes near Ringwood

Assessments were undertaken for certain options (Table 4-11) to consider the risks of transfer of INNS between catchments (especially where raw water transfers were considered). Where appropriate, treatment processes were included so that raw water was not transferred from one catchment to another.

Table 4-11: Example options where INNS assessment was required

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	General Comment
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	New Raw Water Transfer
25.01	Mendips to Stour	New Raw Water Transfer
30.02	Pump Storage - Quantock Reservoir	New Raw Water Transfer
31.02	Raising Dams - Yeovil Reservoir	Increased risk - raising dam and reservoir level
32.03	New Reservoir - Yeovil	New Asset- therefore new risk
32.13	New Reservoir - Dorset Frome	New Asset- therefore new risk
32.24	New Reservoir - Parret	New Asset- therefore new risk
32.36	New Reservoir - Bristol Avon	New Asset- therefore new risk

4.4.6 Protection of Eels

All new supply options were assessed to determine the impacts on Eels and identify if mitigation measures such as screens on intakes were required.

4.5 Stage 3 Option Review

Following the design, costing, carbon and environmental assessments the options were subject to a further review to consider changes to them or remove options which scored poorly in the environmental assessment.

This following section details which options were removed and which were included at this stage and the justification for each. This review was only undertaken for supply schemes as all demand and leakage scenarios were progressed forward to decision making. The following approach was taken:

- Each option was banded into capacity categories 1 to 3 with band 1 below 5Ml/d, band 2 below 10Ml/d or equal to 5Ml/d and band 3 equal to 10 Ml/d or above.
- WFD assessment: A score of 1 was given if the option was likely to be non-compliant or if there was a quantified risk.

- Natural Capital, Biodiversity Net Gain, HRA, SEA and lifetime Carbon were all assessed against the 50th percentile for each of the options. A score of 1 was given if the scheme performs worse than the average within the band.
- The sum of the above bullet points resulted in a maximum score of 6, with higher scores suggesting a higher environmental impact. A preliminary screening was made rejecting scores of 4 or above and including options scoring 3 or below.

Following the preliminary screening the following qualitative elements were also considered:

- The outputs of the metrics are pre mitigation and therefore it has been assumed some impacts could be mitigated. Rejected options were assessed for simple location changes which would make them more acceptable without substantially changing the option. For example, transfer options which were rejected as a result of transecting ancient woodland or designated sites were re-assessed for different routes which would not damage these sites.
- In addition, some supply schemes, such as the regional SRO schemes, are considered to have a higher degree of feasibility having gone via a Gate 1 RAPID assessment and therefore were included in the final options.
- Only options with a high confidence of being viable are included in the assessment. Included options with metrics close to the 50th percentile were reassessed using professional judgement if close to the accept reject boundary between 3 and 4 points to ensure that options were not arbitrarily accepted.

The outputs of the following sections were then included within the decision-making tool. BNG and NC were used qualitatively to review the plans, with detailed further assessments undertaken on the final Preferred Plan.

4.5.1 Supply Option Size Band 1

Table 4-12 shows how each option in Band 1 scored along with the justification for the inclusion or removal of the option from the feasible option list.

Table 4-12: Scoring of each Supply option in Band 1

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Natural Capital	WFD	Biodiversity Net Gain	Combined HRA	Combined SEA	Total carbon (50 year)	Sum of failures	Status	Justification
18.01	Somerset Spine main upgrade	1	0	1	0	0	1	3	Include	The score is close to the boundary for include/reject but as one of the other scores is also close to a positive score of 0 this screening is not considered marginal
18.09	Devizes resilience: Chippenham to Devizes transfer upgrade	0	0	0	0	1	0	1	Include	The option scores well against the metrics
18.10	West Somerset Reservoirs transfer upgrade	0	0	0	1	0	1	2	Include	The option scores well against the metrics
18.26	Bristol import increase towards Trowbridge	1	0	0	1	0	0	2	Include	This score appears close to the boundary, however the effect of the ancient woodland on the score is incorrect as the pipeline does not actually cross its boundary.
18.27	Pewsey Resilience I	0	0	0	0	0	0	0	Include	The option scores well against the metrics
18.28	North Bath Resilience	1	0	0	0	1	0	2	Include	The option scores well against the metrics (Bristol water has provided information on availability and water is available for this scheme)
21.06	Yeovil to Dorchester area new transfer	1	0	1	1	1	1	5	Include	This option scores poorly against the metrics. However, the transfer could be re-routed around the main issues and most of the issues are artefacts of the GIS assessment as the route largely follows the A37 through designated sites and ancient woodland avoiding impacts. Some uncertainty remains around the operation of the source and it's impact on the Yeo and subsequently the Somerset levels but it is possible these could be avoided with correct management.

21.10	Bristol import increase towards Chippenham	1	0	0	1	1	0	3	Include	This option scores poorly against the metrics however this is largely a result of avoidable crossing of protected areas which could be re-routed around or which a re being triggered despite the route following an existing road. Therefore include.
21.11	Devizes resilience: Calne to Devizes new transfer	0	0	0	0	1	0	1	Include	The option scores well against the metrics
21.12	Pewsey resilience II	0	0	0	1	0	1	2	Include	The option scores well against the metrics
21.14	Amesbury to Tidworth transfer	0	0	0	1	0	1	2	Include	The option scores well against the metrics
22.04	Weymouth Source Improvements	0	0	0	0	0	0	0	Include	The option scores well against the metrics
23.01	Yeovil Reservoir peak capacity	1	0	1	0	0	0	2	Include	The option scores well against the metrics
25.03	Grid reinforcements - Wylye valley	0	0	1	1	1	1	4	Include	Options score pooly however this is a transfer options along an existing pipeline so can be included
25.04	South Grid Resilience	1	0	1	1	1	1	5	Include	Options score pooly however this is a transfer options along an existing pipeline so can be included
25.05	North Grid to South Grid reinforcements	1	0	1	1	1	1	5	Include	Options score pooly however this is a transfer options along an existing pipeline so can be included
26.17	Reinstatement of mothballed sources - West Dorchester	1	0	1	0	1	1	4	Include	Rejected as scores poorly against the metrics. However, the HRA of the WRMP24 option concludes that effects possible (pathways present) but significant or significant adverse effects clearly avoidable with established scheme-level avoidance or mitigation measures. Therefore include.
30.02	Pump Storage – Quantock Reservoir	0	0	0	0	0	0	0	Include	The option scores well against the metrics
34.10	Amesbury boreholes	0	1	0	1	0	1	3	Include	The score is close to the boundary for include/reject but none of the 0 scores are marginal
37.06	Water recycling - Quantock Reservoir	0	0	1	1	0	1	3	Include	The score is close to the boundary for include/reject but none of the 0 scores are marginal
37.07	Water recycling - North Somerset Non Household	0	0	1	1	0	1	3	Include	The score is close to the boundary for include/reject but none of the 0 scores are marginal

38.04	Under-utilised licence - Mid Dorset	0	0	0	0	0	0	0	Include	The option scores well against the metrics
38.12	Treatment improvements - East Weymouth Source	0	0	0	0	0	0	0	Include	The option scores well against the metrics however it is only needed for a high nitrate scenario which was not part of the adaptive plan. Include on environmental scoring but likely to be rejected in later stages.
39.02	Under-utilised Licence - North Warminster	0	0	0	1	0	0	1	Include	The option scores well against the metrics
41.01	Drought Permit - Stour catchment	0	0	0	0	0	0	0	Include	The option scores well against the metrics
41.06	Drought Permit - Bride catchment	0	0	0	0	0	0	0	Include	The option scores well against the metrics
55.03	South Grid Resilience - 8Ml/d	1	0	1	1	1	1	5	Include	This option scores poorly against the metrics. However, analysis of the HRA and SEA assessments show that a lot of the poor scoring stems from mapping artefacts as the route of the pipeline actually follows a road through the designated sites and so should be able to avoid damage with good practices used.
55.05	North Grid to South Grid reinforcements - 5.5Ml/d	1	0	1	1	1	1	5	Include	This option scores poorly against the metrics. However, analysis of the HRA and SEA assessments show that a lot of the poor scoring stems from mapping artefacts as the route of the pipeline actually follows a road through the designated sites and so should be able to avoid damage with good practices used.
55.10	Trowbridge to Market Lavington	0	0	0	0	0	0	0	Include	The option scores well against the metrics
55.11	Trowbridge to North Warminster	0	0	0	0	0	0	0	Include	The option scores well against the metrics

55.12	Yeovil to Dorchester - 7Ml/d	1	0	1	1	1	1	5	Include	This option scores poorly against the metrics. However, the transfer could be re-routed around the main issues and most of the issues are artefacts of the GIS assessment as the route largely follows the A37 through designated sites and ancient woodland avoiding impacts. Some uncertainty remains around the operation of the source and it's impact on the Yeo and subsequently the Somerset levels but it is possible these could be avoided with correct management.
70.01	Bristol Import and onwards transfer I	1	0	0	1	1	0	3	Include	This score appears close to the boundary, however the effect of the ancient woodland on the score is incorrect as the pipeline does not actually cross its boundary.
70.02	Bristol Import and onwards transfer II	1	0	0	1	1	1	4	Include	This score appears close to the boundary, however the effect of the ancient woodland on the score is incorrect as the pipeline does not actually cross its boundary.
34.12	North Salisbury Source Relocation	0	1	0	1	1	1	4	Reject	Scores enough to be considered for inclusion against the metrics however there are significant issues within a designated site as a result of construction of the scheme, so this is rejected.
70.06	Increased Reservoir Capacity and East Transfer	1	0	0	1	1	1	4	Include	The option scores well against most metrics, the pipeline is routed through a SSSI at Whitesheet Hill resulting in fails however rerouting could get around this so the option is still feasible.

4.5.2 Supply Options Size Band 2

Table 4-13 shows how each option in Band 2 scored along with the justification for the inclusion or removal of the option from the feasible option list.

Table 4-13: Scoring of each Supply option in Band 2

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Natural Capital	WFD	Biodiversity Net Gain	Combined HRA	Combined SEA	Total carbon (50 year)	Sum of failures	Status	Justification
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	1	1	1	1	1	0	5	Reject	This option scores poorly against the metrics. Although transfers can often be re-routed around protected site this scheme includes a large amount of issues which relate to the source and some transfer issues which would be difficult to route around.
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	1	0	0	1	0	0	2	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
19.10	Severn-Thames Transfer: multiple receivers at 15Ml/d	1	0	0	1	0	0	2	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
25.01	Mendips to Stour	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs

27.04	Under-utilised licence - Wimborne Minster	0	0	0	0	0	0	0	Include	The option scores well against the metrics
31.02	Raising Dams - Yeovil Reservoir	1	0	1	0	0	0	2	Include	The option scores well against the metrics. There is social impact of raising the dam but this is not included within the metric of this screening and will be considered elsewhere in our assessment.
32.24	New Reservoir - Parret	1	1	0	0	1	0	3	Reject	Rejected as scores poorly against the metrics and the scores are not marginal. Loss of land results in poor scoring for NC, WFD and has an effect on designated areas.
33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	0	1	0	1	1	0	3	Reject	Scores enough to technically pass but the raw un-normalised scores in columns E to U show that almost all are close to or above 50%ile for the whole dataset. Additionally option rejected due to confidence related to technical ability and yield. furthermore the fails in the screening relate to effects on WFD and designated area which are unlikely to be mitigated.
34.08	Groundwater - Hampshire Avon I	0	1	0	1	1	0	3	Include	This score appears close to the boundary. However, transfers can be rerouted around issues such as those set out in the environmental assessment and this is reflected in the text of the HRA and SEA assessment.
34.09	Groundwater - Hampshire Avon II	0	1	0	1	0	0	2	Include	The option scores well against the metrics
36.02	Desalination: North Coast Bristol Water - Avonmouth	0	0	0	1	1	0	2	Reject	Scores enough to be considered for inclusion against the metrics. The HRA concludes that for option construction significant effects are certain and adverse effects likely to be unavoidable with scheme as currently conceived (e.g. direct effects on site; permanent loss of habitat features; etc.) - therefore this is a reject
37.05	Water recycling - Bridgwater Reservoir	0	0	1	1	0	0	2	Include	The option scores well against the metrics

37.10	Water recycling - Taunton Canal	0	1	0	1	0	0	2	Include	The option scores well against the metrics however there are concerns which are currently under investigation in WINEP. Option to be considered a pass on current information but under review pending WINEP investigation.
38.01	Underutilised licence due to water quality: Purbeck	0	0	0	0	0	0	0	Include	The option scores well against the metrics
38.06	Under-utilised licence - Mid Stour II	0	0	0	0	0	0	0	Include	The option scores well against the metrics
38.11	Under-utilised licence - East Dorchester Source	1	0	0	0	0	0	1	Include	The option scores well against the metrics
39.01	Under-utilised licence - North East Bath	0	0	0	0	0	0	0	Include	The option scores well against the metrics
52.02	Poole Water Recycling and Transfer – Stour use 50%	0	1	0	1	0	0	2	Include	The option scores well against the metrics
52.03	Poole Water Recycling and Transfer – Stour use 100%	0	1	0	1	0	0	2	Include	The option scores well against the metrics
54.05	Mendips to Stour - 50% capacity	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
54.06	Mendips to Grid - 50% capacity	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
54.07	Mendips to Trowbridge - 50% capacity	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
55.01	CALM main upgrade and reversal - 10Ml/d	0	0	0	1	0	0	1	Include	This option scores a pass against the metrics. Goes through a SSSI whitesheet hill would need a reroute to get around but still feasible.
55.09	Trowbridge to Devizes	0	0	0	1	0	0	1	Include	The option scores well against the metrics
56.01	West Salisbury Boreholes - 7Ml/d	0	1	0	1	0	0	2	Include	The option scores well against the metrics

59.01	Mere Stream Support	1	0	0	0	0	0	1	Include	The option scores well against the metrics
19.03	SWW Reservoir Pump Storage - Tiverton to Taunton Transfer	1	1	1	1	1	0	5	Reject	This option scores poorly against the metrics. Although transfers can often be re-routed around protected site this scheme includes a large amount of issues which relate to the source and some transfer issues which would be difficult to route around.
19.06	Severn-Thames Transfer: WCWRG only at 15Ml/d	1	0	0	1	0	0	2	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river Severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
19.10	Severn-Thames Transfer: multiple receivers at 15Ml/d	1	0	0	1	0	0	2	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river Severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
25.01	Mendips to Stour	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However, it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs
32.24	New Reservoir - Parret	1	1	0	0	1	0	3	Reject	Rejected as scores poorly against the metrics and the scores are not marginal. Loss of land results in poor scoring for NC, WFD and has an effect on designated areas.

33.01	Groundwater: Aquifer Storage Recharge - Wareham Basin	0	1	0	1	1	0	3	Reject	Scores enough to technically pass but the raw un-normalised scores in columns E to U show that almost all are close to or above 50%ile for the whole dataset. Additionally option rejected due to confidence related to technical ability and yield. furthermore the fails in the screening relate to effects on WFD and designated area which are unlikely to be mitigated.
36.02	Desalination: North Coast Bristol Water - Avonmouth	0	0	0	1	1	0	2	Reject	Scores enough to be considered for inclusion against the metrics. The HRA concludes that for option construction significant effects are certain and adverse effects likely to be unavoidable with scheme as currently conceived (e.g. direct effects on site; permanent loss of habitat features; etc.) - therefore this is a reject
53.01	Bristol New Reservoir - Wessex Share 18Ml/d	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs
54.05	Mendips to Stour - 50% capacity	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
54.06	Mendips to Grid - 50% capacity	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
54.07	Mendips to Trowbridge - 50% capacity	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites

4.5.3 Supply Option Size Band 3

Table 4-14 shows how each option in Band 3 scored along with the justification for the inclusion or removal of the option from the feasible option list

Table 4-14: Scoring of each Supply option in Band 3

For security reasons this table has been redacted and edited for the version that is published on our website.

Option ID	Option Name	Natural Capital	WFD	Biodiversity Net Gain	Combined HRA	Combined SEA	Total carbon (50 years)	Sum of failures	Status	Justification
18.02	CALM main upgrade and reversal	0	0	0	1	0	0	1	Include	The option scores well against the metrics, Goes through a SSSI whitesheethill would need a reroute to get around but still feasible.
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	0	0	0	1	0	0	1	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	0	0	0	1	0	0	1	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
21.13	Salisbury to Amesbury to Tidworth Transfer	0	0	0	1	0	0	1	Include	The option scores well against the metrics
32.03	New Reservoir - Yeovil	0	1	0	1	0	0	2	Reject	Rejected as scores poorly against the metrics. This scheme has been rejected due to environmental impacts and WFD failure is also a quantified risk

32.13	New Reservoir - Dorset Frome	1	1	0	1	1	0	4	Reject	Rejected as scores poorly against the metrics and the scores are not marginal. Loss of land results in poor scoring for NC, WFD and has an effect on designated areas.
32.36	New Reservoir - Bristol Avon	1	1	0	0	0	0	2	Reject	Scores enough to technically pass but the raw un-normalised scores in columns E to U show that almost all scores are close to or above 50%ile. Plus there are issues with WFD from loss of land which could not be mitigated.
34.11	West Salisbury Boreholes	0	1	0	1	0	0	2	Include	The option scores well against the metrics - The HRA concludes that construction effects on the Avon and other nearby sites (e.g. Salisbury Plain SAC/SPA) would be avoidable with normal measures
54.01	Mendips to Grid	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs
54.03	Mendips to Trowbridge	1	0	0	1	0	0	2	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs
54.04	Mendips to Grid and Trowbridge	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
54.08	Mendips to Grid and Trowbridge - 50% capacity	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
58.01	Bristol Bulk Import - 15Ml/d	0	0	0	0	1	0	1	Include	The option scores well against the metrics
70.03	Bristol Import and onwards transfer III	0	0	0	1	1	0	2	Include	The option scores well against the metrics
70.04	Bristol Import and onwards transfer IV	0	0	0	0	0	0	0	Include	The option scores well against the metrics
70.05	Bristol Import and onwards transfer V	0	0	0	1	1	0	2	Include	The option scores well against the metrics

70.07	Hampshire Avon Boreholes and Transfer	0	1	0	1	0	0	2	Include	The option scores well against the metrics
19.07	Severn-Thames Transfer: WCWRG only at 30Ml/d	0	0	0	1	0	0	1	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
19.11	Severn-Thames Transfer: multiple receivers at 30Ml/d	0	0	0	1	0	0	1	Reject	This option scored a pass against the metrics and also is an SRO. Considerable issues remain with the sources of the water which will ofset supply from Vyrnwy and the transfer through the river severn itself which impact on designated sites rather than the pipeline which could feasibly be re-routed around protected areas, as a result this option should be rejected.
32.01	Bristol New Reservoir	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs
32.03	New Reservoir - Yeovil	0	1	0	1	0	0	2	Reject	Rejected as scores poorly against the metrics. This scheme has been rejected due to environmental impacts and WFD failure is also a quantified risk
32.13	New Reservoir - Dorset Frome	1	1	0	1	1	0	4	Reject	Rejected as scores poorly against the metrics and the scores are not marginal. Loss of land results in poor scoring for NC, WFD and has an effect on designated areas.
32.36	New Reservoir - Bristol Avon	1	1	0	0	0	0	2	Reject	Scores enough to technically pass but the raw un-normalised scores in columns E to U show that almost all scores are close to or above 50%ile. Plus there are issues with WFD from loss of land which could not be mitigated.
54.01	Mendips to Grid	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs

54.03	Mendips to Trowbridge	1	0	0	1	0	0	2	Reject	This option scored a reject against the metrics in particular due to the source rather than just the transfer. However it is an SRO which has passed gate 1 and so should be included in a separate set of runs which include the SROs
54.04	Mendips to Grid and Trowbridge	1	1	0	1	1	0	4	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites
54.08	Mendips to Grid and Trowbridge - 50% capacity	1	0	0	1	1	0	3	Reject	This option scored a reject against the metrics and significantly the source of the transfer scores poorly due to possible effects on designated sites

5. Stage 4: EBSD modelling

The outputs of stage 3 were fed into the EBSD modelling to generate the preferred programme of options. The process to generate the preferred programme and the outputs are detailed in the Decision Making and Uncertainty technical appendix.

A full list of all the data for each of the feasible options, including costs, environmental impacts and carbon are provided in Table 4 of the Water Resource Planning Tables.

Annex A. Workshops and meetings progress

Date	Meeting / workshop / action	Outcome
June 2021	North Wiltshire Production: existing site options	Identified options for our existing (or mothballed) WTCs with regards to: • Decreasing outages • Increasing site output • Improving site resilience
June 2021	Somerset Production: existing site options	Identified options for our existing (or mothballed) WTCs with regards to: • Decreasing outages • Increasing site output • Improving site resilience
June 2021	South Wiltshire Production: existing site options	Identified options for our existing (or mothballed) WTCs with regards to: • Decreasing outages • Increasing site output • Improving site resilience
June 2021	Dorset Production: existing site options	Identified options for our existing (or mothballed) WTCs with regards to: • Decreasing outages • Increasing site output • Improving site resilience
June 2021	Strategic Regional Options (SROs) as part of WCWRG planning	Collating more information on strategic options for the West Country Region including: • Water recycling • WCWRG North transfer (Cheddar) • WCWRG South transfer (Roadford)
June 2021	Environmental Investigations: WINEP and Environmental Ambition	Collating information from our current WINEP investigations to gain a better understanding of which sites might see licence restrictions in the coming years. This will help us assess our options in our screening process, avoiding site improvements where licenced outputs will decrease
July 2021	Internal review of EA CAMS documents	This session helped to identify areas within our region that could have surplus water available for abstraction at different flow scenarios.
July 2021	North Networks and Distribution: network improvements and options	Identified areas within the Northern part of our Distribution network that could be improved through reinforcement schemes and identified other options for providing resilience to areas of deficit.
July 2021	South Networks and Distribution: network improvements and options	Identified areas within the Southern part of our Distribution network that could be improved through reinforcement schemes and identified other options for providing resilience to areas of deficit.

Date	Meeting / workshop / action	Outcome
July 2021	West Networks and Distribution: network improvements and options	Identified areas within the Western part of our Distribution network that could be improved through reinforcement schemes and identified other options for providing resilience to areas of deficit.
July 2021	Unconstrained options: Customers	Identified a range of customer focused options to add to our unconstrained list. Majority of these were scale able, so could increase their scope to target different levels of demand reduction
June 2021	Unconstrained options: Leakage	Identified a range of leakage options to add to our unconstrained list. Majority of these were scale able, so could increase their scope to target different levels of demand reduction

Annex B. List of Demand and Leakage Scenarios

The table below provides a list of the demand and leakage scenarios that we considered.

Leakage options were combined with other demand management strategy options to create seven demand option portfolios for our revised draft plan, see Table 4-1.

Scenario Name	Summary	Description
Demand Scenario 1	Optant metering only	This is our baseline demand scenario which considers the impacts of our current optant metering strategy of basic metering. It provides a reference for all the other scenarios.
Demand Scenario 2	Optant metering and Household Water Efficiency to reduce demand by 48Ml/d	We determined that reducing PCC to the government expectation of 110l/h/d was equivalent to reducing total consumption by 48Ml/d. This scenario explores what household water efficiency projects would be needed to achieve this with an optant-only metering policy.
Demand scenario 3	Optant metering, Household Water Efficiency and non-household water efficiency to reduce demand by 48Ml/d	Similar to Demand Scenario 2 above, this option explores if it is possible to achieve a 48Ml/d reduction in demand by optant metering and a combination of household and non-household water efficiency programmes
Demand scenario 4	Compulsory metering using basic meters and Household Water Efficiency and non-household water efficiency to reduce demand by 48Ml/d	This scenario is similar to scenario 3 but considers a compulsory metering programme using basic meters to meet the reduction of 48Ml/d.
Demand scenario 5	Compulsory metering using AMR meters and Household Water Efficiency and non-household water efficiency to reduce demand by 48Ml/d. We considered both inclusion and exclusion of the government appliance labelling scheme.	This scenario is similar to scenario 4 but considers a compulsory metering programme using AMR meters to meet the reduction of 48Ml/d. We did a sensitivity test to see if AMI meters provided better value but based on current costs, we could not make a case for AMI metering. This scenario is consistent with Ofwat's High Tech scenario 2.
Demand Scenario 6	Compulsory metering using basic meters and Household	This scenario is similar to scenario 4 but explores the

Scenario Name	Summary	Description
	Water Efficiency and non-household water efficiency to reduce demand by 34Ml/d. We considered both inclusion and exclusion of the government appliance labelling scheme.	impacts of reducing the number of household water efficiency surveys, so that the total savings from the programme is 34Ml/d. This is cheaper than scenario 4 but saves less water.
Demand scenario 7	Compulsory metering using AMR meters and Household Water Efficiency and non-household water efficiency to reduce demand by 34Ml/d. We considered both inclusion and exclusion of the government appliance labelling scheme.	This scenario is similar to scenario 5 but explores the impacts of reducing the number of household water efficiency surveys, so that the total savings from the programme is 34Ml/d. This is cheaper than scenario 4 but saves less water. This scenario is consistent with Ofwat's High Tech scenario 2.
Demand Scenario 8	Compulsory metering using basic meters and Household Water Efficiency and non-household water efficiency to reduce demand by 16Ml/d. We considered both inclusion and exclusion of the government appliance labelling scheme.	This scenario is similar to scenarios 4 and 6 but explores the impacts of reducing the number of household water efficiency surveys, so that the total savings from the programme is 16Ml/d. This is cheaper than scenarios 4 and 6 but saves less water.
Demand scenario 9	Compulsory metering using AMR meters without any additional water efficiency.	This scenario shows the benefits of AMR metering only, excluding any water efficiency. This scenario is consistent with Ofwat's High Tech scenario 2
Demand Scenario 10	Just government labelling	This scenario explores the impact of government labelling of devices only, excluding any additional metering above baseline or water efficiency
Demand scenario 11	Smart metering by 2035, with water efficiency to meet a reduction of demand of 48Ml/d by 2050.	This scenario is consistent with Ofwat's High 1 Reference scenario and includes development of a smart network by 2035 and meeting the equivalent of a reduction in PCC to 110l/h/d by 2050.
Demand scenario 12	Smart metering by 2040, with water efficiency to meet a reduction of demand of 48Ml/d by 2050.	This scenario explores the impact of implementing Ofwat's High 1 reference scenario but five years later, to align more closely with government's expectations regarding leakage and PCC reductions by 2050.

Scenario Name	Summary	Description
Demand scenario 13	Adaptive pathways scenario where AMR meters are piloted in AMP8 with a review at the end of the period, and an assumption that compulsory AMR metering is then applied across the company by 2050.	This scenario provides an adaptive plan opportunity and is consistent with Ofwat's High 2 reference scenario. It achieves the equivalent demand reductions to reducing PCC to 110l/h/d.
Demand scenario 14	Adaptive pathways scenario where AMR meters are piloted in AMP8 with a review at the end of the period, and an assumption that compulsory basic metering is then applied across the company by 2050.	This scenario provides an adaptive plan opportunity. It is similar to Demand Scenario 13 but does not achieve the equivalent demand reductions to reducing PCC to 110l/h/d.
Demand scenario 15	Adaptive pathways scenario where AMR meters are piloted in AMP8 along with a Basic Metering compulsory Programme with a review at the end of the period. It is then assumed that compulsory basic metering is then applied across the company by 2050.	This scenario provides an adaptive plan opportunity. It has a compulsory metering programme using Basic Meters in AMP8, with a simultaneous AMR metering trial. At the end of the trial, it is assumed that AMR metering is not cost-effective and the programme reverts to a compulsory programme of basic meters.
Demand scenario 16	Adaptive pathways scenario where AMR meters are piloted in AMP8 along with a Basic Metering compulsory Programme with a review at the end of the period. It is then assumed that AMR metering is then applied across the company by 2050.	This scenario provides an adaptive plan opportunity. It has a compulsory metering programme using Basic Meters in AMP8, with a simultaneous AMR metering trial. At the end of the trial, it is assumed that AMR metering is cost-effective and the programme reverts to a compulsory programme of AMR meters.
Leakage scenario 1	No reduction in leakage.	This scenario provides the costs for holding leakage at current levels and provides a baseline.
Leakage scenario 2	Very Slow rate of reduction to 20% by 2049/50	This scenario has a low rate of leakage reduction and is a useful comparison with the other scenarios, in particular to see if it selected in a least cost plan.
Leakage scenario 3	Slow rate of reduction to 30% by 2049/50	This scenario reduces leakage by 30% from current levels by 2050 and is a useful comparison, in particular to see if it selected in a least cost plan.

Scenario Name	Summary	Description
Leakage scenario 4	Towards 50% in 2049/50 but hold steady from 2034/35	This is a scenario which could be part of an adaptive plan, where leakage is reduced to meet a reduction of 50% by 2050 but there is a review at 2034/5. It is consistent with Ofwat's high 2 reference scenarios.
Leakage scenario 5	Towards 50% in 2049/50 but hold steady from 2039/40	This is a scenario which could be part of an adaptive plan, where leakage is reduced to meet a reduction of 50% by 2050 but there is a review at 2034/5. It is consistent with Ofwat's high 2 reference scenario.
Leakage scenario 6	Linear reduction to 50% by 2049/50	This scenario meets government expectations to reduce leakage by 50% and also Ofwat's reference scenario high 2.
Leakage scenario 7	Fast rate of reduction for 30% in 2030 then 50% by 2049/50	This option explores the benefits of early leakage reduction and is broadly consistent with Ofwat's High 1 reference scenario.

Annex C. Refinement of Water Recycling and Reservoir Options

Approach to water recycling options

This section summaries the proposed method to identify the most feasible options for the water recycling opportunities identified by Stantec in the West Country South Strategic Option Development. An evidence-based approach is proposed to reduce the list. Wessex Water WRMP24.

An evidence-based approach is suggested to reduce the list, using a number of criteria. These criteria are outlined in Table C-1. It is recommended some potential site options are ruled out based on 'Go/No Go' testing (where the risk is considered too great), whilst other criteria was assigned values between 0 and 2, with 0 being a good score and 2 being a poor score. These scores would then contribute to an overall score and final ranking of the potential sites.

Table C-1: Proposed criteria and scoring method

Proposed criteria	Proposed scoring
Mining pipe pathway	Does not run through 'Development High Risk Areas' and 'Coal Mining Reporting Areas' (Category: no; Score: 0) Runs through 'Development High Risk Areas' and 'Coal Mining Reporting Areas' (Category: yes; Score: 1)
Mining reservoir footprint	'Go/ No Go'
Reverse Osmosis	• RO not required (Category: no; Score: 0) • RO potentially required (Category: potentially; Score: 0.5) • RO required (Category: yes; Score: 1)
Faults: reservoir footprint	• Omitted from final scoring as no variation in options
Permeability: reservoir footprint	• Omitted from final scoring as no variation in options
Seismic activity	• Omitted from final scoring as no variation across the area
AONB: pipeline pathway	• Not in an AONB (Category: no; Score: 0) • Can be diverted around an AONB (Category: diverted; Score: 1) • Cannot be diverted around (Category: yes; Score: 2)
AONB: reservoir footprint	• Not in an AONB (Category: no; Score: 0) • In an AONB (Category: yes; Score: 1)
Environmental designation: pipeline pathway	• Not in an environmental designation (Category: no; Score: 0) • Proximal to an environmental designation zone (Category: Proximal; Score: 0.5) • In an environmental designation (Category: yes; Score: 1)
Environmental designation: reservoir footprint	• 'Go/ No Go'

Proposed criteria	Proposed scoring
CAMS of river currently discharged into	• Flows into a green CAMS zone that is not environmentally designated (includes estuaries/ coastal waters) (Category: one; Score: 0) • Flows into a green CAMS zone that is environmentally designated (includes estuaries/ coastal waters) (Category: two; Score: 1) • Flows into a yellow CAMS zone that is environmentally designated (Category: three; Score: 2)
Downstream population risk of new reservoir	• Low Risk – ≤5 properties (Category: LR; Score: 1) • Medium Risk – 5-100 properties (Category: MR; Score: 2) • High Risk - >100 properties (Category: HR; Score: 3).

Mining

The Interactive Map Viewer provided by The Coal Authority can be used to survey the pathway of the pipeline and footprint of the new reservoir site (if required) for evidence of mining.

Mining: reservoir footprint

It is suggested that potential reservoir sites are subjected to 'Go/No Go' testing, and any site that lies within 'Development High Risk Areas' and 'Coal Mining Reporting Areas' is omitted from the potential sites.

Mining: pipe pathway

The pipeline pathway should be studied to see if it falls on any land that is a 'Development High Risk Areas' or 'Coal Mining Reporting Areas' and can be allocated a category and corresponding score based on whether it:

- Does not run through 'Development High Risk Areas' and 'Coal Mining Reporting Areas' (Category: no; Score: 0)
- Runs through 'Development High Risk Areas' and 'Coal Mining Reporting Areas' (Category: yes; Score: 1).

Reverse osmosis

Sites that require reverse osmosis (RO), due to water quality issues such as salt intrusions, are likely to be more expensive and less carbon friendly. It is recommended that each option is allocated a category and corresponding score based on whether:

- RO not required (Category: no; Score: 0)
- RO potentially required (Category: potentially; Score: 0.5)
- RO required (Category: yes; Score: 1).

Geology

All data on geology can be obtained from the British Geological Survey GeoIndex (onshore) map viewer.

Faults: reservoir footprint

If a new reservoir is required for an option, the reservoir footprint can be allocated a category and corresponding score based on whether there is:

- No faults (Category: no; Score: 0)
- Faults less than 1km from the footprint (Category: proximal; Score: 1)
- Faulty running through the footprint of the potential reservoir (Category: yes; Score: 2).

As none of the potential reservoir footprints have faults running through them or in close proximity, this criterion can be excluded from the final scoring.

Permeability: reservoir footprint

Borehole data, geological formation, and hydrogeology data on groundwater can be used to assess the permeability of the underlying rocks, if a new reservoir is required for an option. This data can be used to allocate a category and corresponding score based on the permeability of the geology:

- Low Permeability (Category: Low; Score: 0)
- Moderate Permeability (Category: Moderate; Score: 1)
- High Permeability (Category: High; Score: 2).

As all of the potential reservoir footprints moderate permeability, this criterion can be excluded from the final scoring.

Seismic Activity

It is suggested that the seismic activity for the area is studied because if there is variation across the area, there could be locations that are more feasible to carry out water recycling. However, as the Peak Ground Acceleration (for a 2500-year return period) for the area is found to be between 0.02-0.06g, with very little variation this criteria can be excluded, as it would have little to no impact on the overall score.

Environmental designations

Data for the location of Ramsar Sites, Areas of Outstanding Natural Beauty (AONB), Special Protection Areas (SPAs), and Special Areas of Conservation (SACs) can be obtained from the British Geological Survey GeoIndex (onshore) map viewer.

Area of Outstanding Natural Beauty (AONB) – pipe pathway

It is proposed that the pathway of the pipeline is surveyed, and all pipe pathways that lie within an AONB are allocated a score of 1 as below:

- Not in an AONB (Category: no; Score: 0)
- In an AONB (Category: yes; Score: 1).

Area of Outstanding Natural Beauty (AONB) – reservoir footprint

It is suggested that the footprint of the new reservoirs (if required) site is surveyed, and all reservoir footprints that lie within an AONB are allocated a score of 1 as below:

- Not in an AONB (Category: no; Score: 0)
- In an AONB (Category: yes; Score: 1).

Environmental designation – pipe pathway

It is recommended that the pathway of the pipeline is analysed to see if it falls within an SSSI, Ramsar Site, a SAC or an SPA, and are scored as below:

- Not in an environmental designation (Category: no; Score: 0)
- Proximal to an environmental designation zone (Category: Proximal; Score: 0.5)
- In an environmental designation (Category: yes; Score: 1).

Environmental designation – reservoir footprint

It is recommended that the footprint of the new reservoirs (if required) site is analysed to see if it falls within an SSSI, Ramsar Site, a SAC or an SPA, and are scored as below:

- Not in an environmental designation (Category: no; Score: 0)
- Proximal to an environmental designation zone (Category: Proximal; Score: 0.5)
- In an environmental designation (Category: yes; Score: 1).

Environmental designation – river currently discharged to

It is suggested that the pathway of the river that the WwTW currently discharges into is analysed to see if it flows through an SSSI, Ramsar Site, a SAC or an SPA. Additionally, the Environment Agency Abstraction Licensing Strategy should be consulted to see if there is a) water available for abstraction (green); b) restricted water available (yellow); or c) water not available (red).

If a river has restricted water or no water available for abstraction and it has an environmental designation, this should receive a higher score, as it will be more impacted by reduced effluent discharge from its WwTW. Whereas if a river has water available for abstraction it should receive a lower score as it will be less impacted by reduced current effluent discharge. Categories and scores can be allocated as below:

- Flows into a green CAMS zone that is not environmentally designated (includes estuaries/ coastal waters) (Category: one; Score: 0)
- Flows into a green CAMS zone that is environmentally designated (includes estuaries/ coastal waters) (Category: two; Score: 1)
- Flows into a yellow CAMS zone that is environmentally designated (Category: three; Score: 2).

Environmental designation – downstream of reservoir

The pathway of the river flowing from the reservoir that would be built at the potential site should be analysed to see if it flows through a Ramsar Site, a SAC or an SPA, and allocated categories and scores as below:

- Does not flow through any environmentally designated rivers (Category: no; Score: 0)
- Flows through an environmentally designated river (Category: yes; Score: 1).

Downstream population risk

If a new reservoir is required, the location of this should be studied along with a digital elevation model to see where would be flooded should the dam fail, to find the number of

properties at risk. After discussion with our reservoir experts, for upstream sites, with steeper valleys, a distance of 5m was assessed, and for downstream valleys, with significantly flatter land, a distance of 1km was assessed. The proposed categories and corresponding scores are suggested:

- Low Risk – ≤5 properties (Category: LR; Score: 1)
- Medium Risk – 5-100 properties (Category: MR; Score: 2)
- High Risk - >100 properties (Category: HR; Score: 3).

Total score

It is advised that the total sum of each potential site's criteria values are found, and then the sites are ranked, from lowest to highest value.

Approach

This section summarises the method used to identify the most feasible options for new surface water reservoir sites. An evidence-based approach was used to reduce the list using ten factors as advised by reservoir experts. These criteria are outlined in Table C-2. Some potential site options were ruled out based on 'Go/No Go' testing (where our reservoir experts felt the risk was too great), whilst other criteria were assigned values between 0 and 3, with 0 being a good score and 3 being a poor score. These scores contributed to the overall score and final ranking of the potential sites.

Table C-2: Criteria assessed and scoring method

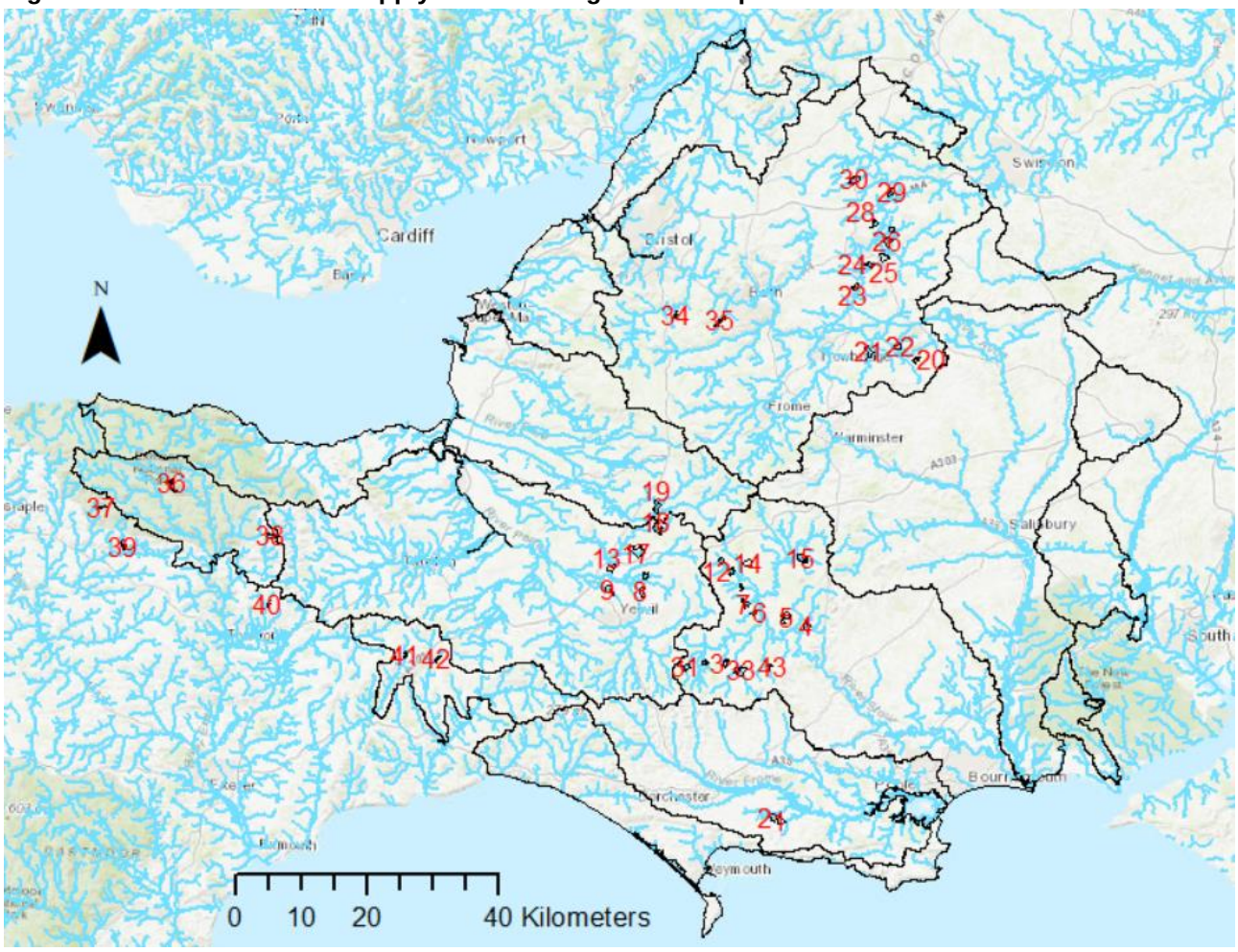
Criteria assessed	Scoring
Mining	• 'Go/ No Go'
Faults	• No faults (Category: N; Score: 0) • Faults less than 1km from the footprint (Category: Proximal; Score: 1) • Faulty running through the footprint of the potential reservoir (Category: Y; Score: 2).
Permeability	• Low Permeability (Category: Low; Score: 0) • Moderate Permeability (Category: Moderate; Score: 1) • High Permeability (Category: High; Score: No Go)
Seismic activity	• Omitted from final scoring
AONB	• Not in an AONB (Category: N; Score: 0) • In an AONB (Category: Y; Score: 1)
Environmental designated area footprint	• Omitted from final scoring
Environmental designated area pathway	• Does not flow through any environmentally designated land (Category: N; Score: 0) • Mouth of river is on coastline that has an environmental designation (Category: Coastal; Score 0.5) • River flows into estuary that has an environmental designation (Category: Estuary; Score: 1) • River flows through land that has an environmental designation (Category: Y; Score: 2).

Criteria assessed	Scoring
Dam volume	• <75000m^3 (Category: Low; Score: 1) • >75000m^3, <125000m^3 (Category: Medium; Score: 2) • > 125000m^3 (Category: High; Score: 3).
Downstream population risk	• Low Risk – ≤5 properties (Category: LR; Score: 1) • Medium Risk – 5-100 properties (Category: MR; Score: 2) • High Risk - >100 properties (Category: HR; Score: 3).
Reservoir capacity	• Low Capacity – <3000000m^3 (Category: LC; Score: 3) • Medium Capacity – >3000000m^3, <6000000m^3 (Category: MC; Score: 2) • High Capacity – > 6000000m^3 (Category: HC; Score: 1).
Reservoir yield	• Low yield – <25ml/d (Category: LY; Score 3) • Medium yield – 25-50ml/d (Category: MY; Score: 2) • High yield – 50-100ml/d (Category: HY; Score: 1) • Very high yield - >100ml/d (Category: VY; Score 0)

Reservoir options

Figure C-1, which maps the extent of the Wessex Water supply zone and surrounding area, was produced in ArcMap. This map shows the OS Terrain 50m Digital Elevation Model (not shown in figure), the rivers, existing reservoirs, and river catchments in the area. The map also highlights the new surface water reservoir sites. This data was obtained from open-source national GIS datasets and Wood.

Figure C-5-1: Wessex Water supply area showing rivers and potential site locations



Mining

Using the Interactive Map Viewer provided by The Coal Authority the footprint, nearby area (~1km), and pathway (~5km downstream) of the potential site were surveyed for evidence of mining. Potential sites were subjected to 'Go/No Go' testing, and any site that would be impacted by 'Development High Risk Areas' and 'Coal Mining Reporting Areas' were omitted from the potential sites.

Geology

All data on geology was obtained from the British Geological Survey GeoIndex (onshore) map viewer.

Faults

All potential sites were allocated a category and corresponding score based on whether there was:

- No faults (Category: N; Score: 0)
- Faults less than 1km from the footprint (Category: Proximal; Score: 1)
- Faulty running through the footprint of the potential reservoir (Category: Y; Score: 2).

Permeability

Borehole data, geological formation, and hydrogeology data on groundwater were used to assess the permeability of the underlying rocks. This data was used to allocate a category and corresponding score based on the permeability of the geology:

- Low Permeability (Category: Low; Score: 0)
- Moderate Permeability (Category: Moderate; Score: 1)
- High Permeability (Category: High; Score: 2).

Any site that had high permeability was omitted as a 'No Go' site.

Seismic Activity

The Peak Ground Acceleration (for a 2500-year return period) for the area was found to be between 0.02-0.06g. Very little variation was found across the area, so this criteria was excluded, as it would have little to no impact on the overall score.

Environmental designations

Data for the location of Ramsar Sites, Areas of Outstanding Natural Beauty (AONB), Special Protection Areas (SPAs), and Special Areas of Conservation (SACs) was obtained from the British Geological Survey GeoIndex (onshore) map viewer.

Area of Outstanding Natural Beauty (AONB)

The Wood report highlights that some of the potential sites lie within an AONB, and these have been flagged but not excluded from the list. They noted that these locations may be limited by their promotability. Therefore, all site locations that lie within an AONB were allocated a score of 1 as below:

- Not in an AONB (Category: N; Score: 0)
- In an AONB (Category: Y; Score: 1).

Footprint

The footprint of the potential site was analysed to see if it fell within a Ramsar Site, a SAC or an SPA. As no potential site fell directly within an environmental designation, this criterion was omitted.

Pathway

The pathway of the river flowing from the reservoir that would be built at the potential site was analysed to see if it flowed through a Ramsar Site, a SAC or an SPA, and was allocated categories and scores as below:

- Does not flow through any environmentally designated land (Category: N; Score: 0)
- Mouth of river is on coastline that has an environmental designation (Category: Coastal; Score 0.5)
- River flows into estuary that has an environmental designation (Category: Estuary; Score: 1)
- River flows through land that has an environmental designation (Category: Y; Score: 2).

Every environmentally designated area that the river flowed contributed to that potential site's score. For example, if a river flowed through a coastal Ramsar Site and an inland SAC this would result in a score of 2.5 (0.5+2=2.5). If environmental designation zones coincided, this was only counted once.

Dam volume

An estimate of the volume of material required to build the dam for the reservoirs on the potential sites was calculated. Wood provided the length and height of the dam required, and in discussion with our reservoir experts, it was assumed the top of the dam would be 5m wide, and the slope of the dam would be 1 in 3 (0.33 radians). The volume of material required was then categorised and scored as below:

- <75000m^3 (Category: Low; Score: 1)
- >75000m^3, <125000m^3 (Category: Medium; Score: 2)
- > 125000m^3 (Category: High; Score: 3).

Downstream population risk

Although the Wood report takes into consideration the houses, roads and railways that would need to be flooded to build the reservoir on the potential site, it does not take into consideration the impact on the properties and population downstream should the dam burst. Figure C-1 was studied to see the number of properties that would be affected by a burst. After discussion with our reservoir experts, for upstream sites, with steeper valleys, a distance of 5m was assessed, and for downstream valleys, with significantly flatter land, a distance of 1km was assessed.

- Low Risk – ≤5 properties (Category: LR; Score: 1)
- Medium Risk – 5-100 properties (Category: MR; Score: 2)
- High Risk - >100 properties (Category: HR; Score: 3).

Reservoir capacity

Wood provided data on the reservoir capacity, and the potential sites were ranked as below, with the largest volumes of water producing the best score, as it provides more resilience.

- Low Capacity – <3000000m^3 (Category: LC; Score: 3)
- Medium Capacity – >3000000m^3, <6000000m^3 (Category: MC; Score: 2)
- High Capacity – > 6000000m^3 (Category: HC; Score: 1).

Reservoir yield

Wood provided data on the reservoir total annual average refill, and this has been used as a proxy for outflow. Potential sites were ranked as below, with the largest volumes of water producing the best score.

- Low yield – <25ml/d (Category: LY; Score 3)
- Medium yield – 25-50ml/d (Category: MY; Score: 2)
- High yield – 50-100ml/d (Category: HY; Score: 1)
- Very high yield - >100ml/d (Category: VY; Score 0).

It is recognised that inflow is not the same as yield, but as the yield of the reservoir was not calculated this is a useful metric. It is therefore recommended that more detailed modelling is carried out, at some point in the future.

Total score

The total sum of each potential site's criteria values was found, and then the sites were ranked, from lowest to highest value. For example, Tadnoll Reservoir (Reservoir ID: 1), had a score of 11 and was therefore ranked as 34th out of 43, whilst Hotwell Reservoir (Reservoir ID: 3), had a score of 10 and was therefore ranked as 23rd out of 43.

Results

The seven lowest scoring sites and the lowest scoring site for each catchment area were obtained from the rankings and are presented in Table C-3 and Table C-4, respectively. Table C-3 shows that all the best scoring reservoirs are in the Dorset Stour, which is generally a function of there being lower scores for environmental impacts on SPAs. SPAs and Ramsar sites than other catchments.

Table C-4 shows that in some catchments more than some reservoirs have the same score (e.g., in the Parrett Catchment reservoirs, 9, 13 and 18 all score 8.5).

Table C-3 and Table C-4 are displayed in map form in Figure C-2 and Figure C-3, respectively.

Table C-3: Lowest scoring potential sites

For security reasons the potential reservoir names have been redacted from this table.

Potential site ID	Reservoir Name	Overall rank	Score	Catchment Area
4		1	6.5	Dorset Stour
10		1	6.5	Dorset Stour
7		3	7.5	Dorset Stour
12		3	7.5	Dorset Stour
16		3	7.5	Dorset Stour
31		3	7.5	Dorset Stour
43		3	7.5	Dorset Stour

Table C-4: Lowest scoring potential site for each catchment area

For security reasons the potential reservoir names have been redacted from this table.

Catchment area	'Best' potential site ID	Reservoir Names	Overall rank	Score
Frome (Poole Harbour)	2		23	10
Dorset Stour	4, 10		1	6.5
Parrett	9, 13, 18,		9	8.5
Bristol Avon	25		8	8
Ewe Otter Axe	36, 38		23	10
Brue Axe	19		9	8.5

Figure C-5-2: Location of seven lowest ranking potential sites

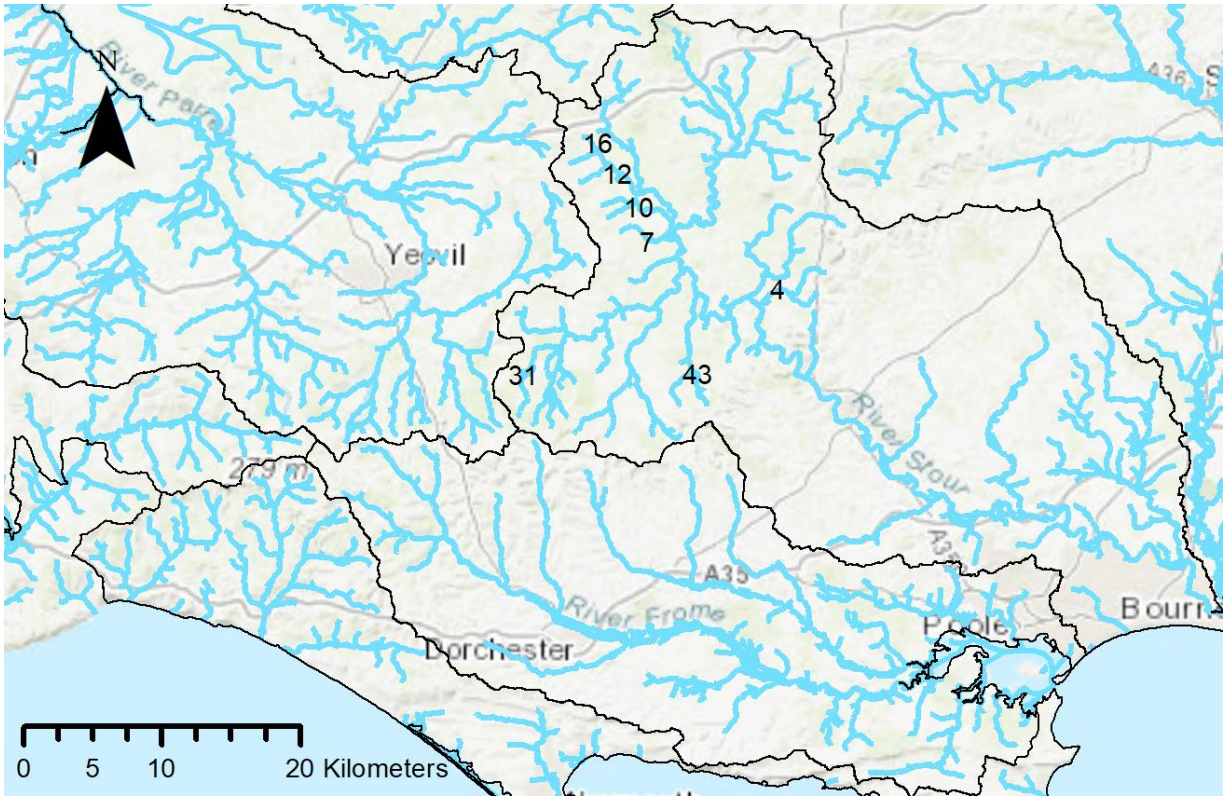


Figure C-5-3: Location of best potential site options for each catchment

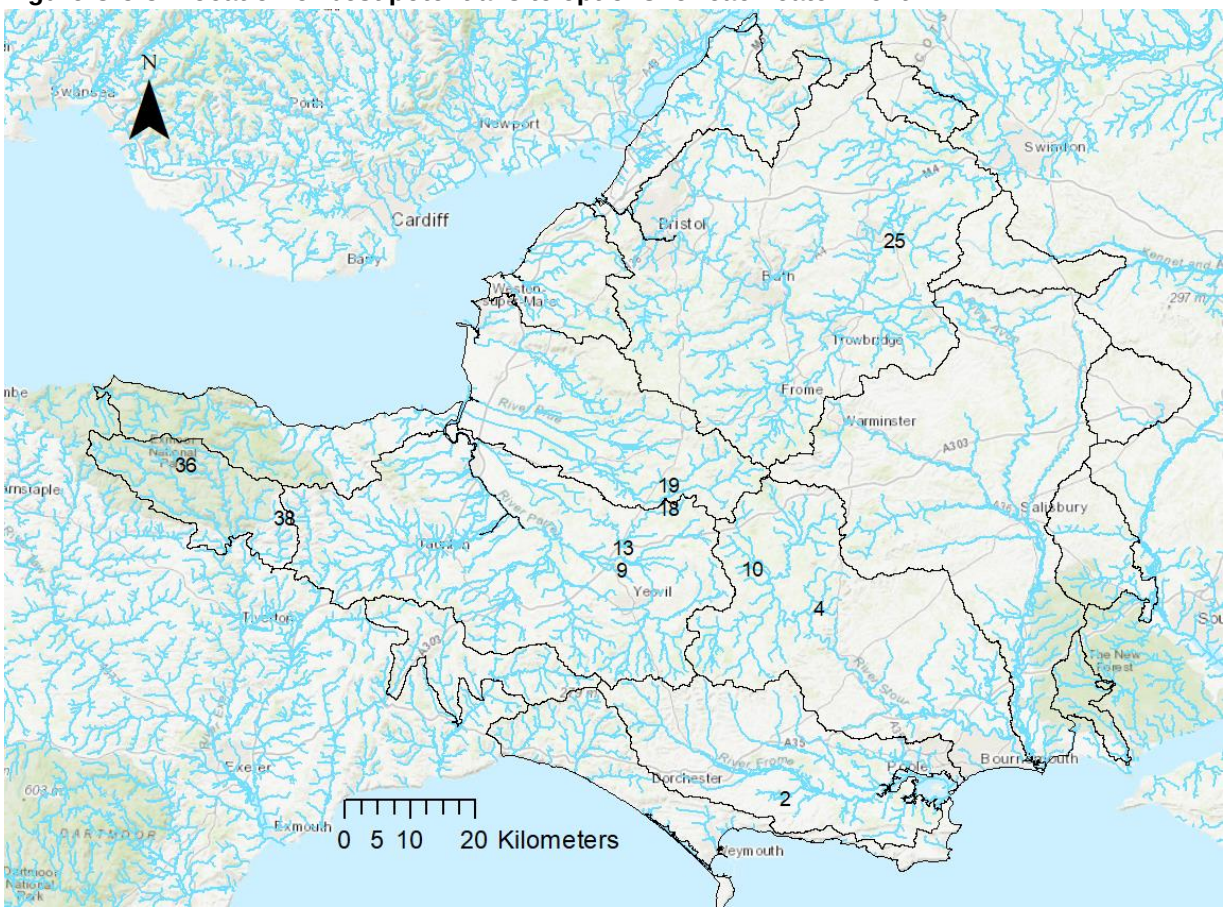


Table C-5: Shows the scores for the key criteria for each reservoir. The top seven potential sites are highlighted in green, and the potenital sites allocated 'no go' status are highlighted in red

For security reasons this table is redacted from the version of this document that appears on the website.

Rejection Register - D

For security reasons this table has been redacted and edited for the version that is published on our website.

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
1.01	Standard compulsory metering: 95% metered by 2050	Need to include compulsory metering as an option, this standard metering option would be less costly than Smart metering, but also likely to provide less of a demand decrease. To be included for comparison	Standalone option - combined into scenario
1.02	Standard compulsory metering: 95% metered by 2035	Same as option 1.01, but at a faster rate. Need to include compulsory metering as an option, this standard metering option would be less costly than Smart metering, but also likely to provide less of a demand decrease. To be included for comparison	Standalone option - combined into scenario
1.03	Smart metering - compulsory adaptive household roll out Phase 1	Option to target a specific area with Smart metering, to assess impacts before adopting larger scale roll out in future AMPs. Environmental impact from new meters, but reduced usage of water and greater awareness from customers would lead to benefits elsewhere in PCC.	Standalone option - combined into scenario
1.04	Smart metering - compulsory adaptive non-household roll out Phase 1	Option to target a specific area with Smart metering, to assess impacts before adopting larger scale roll out in future AMPs. Environmental impact from new meters, but reduced usage of water and greater awareness from non-household customers would lead to benefits elsewhere in PCC. Businesses may look to reduce water at other non-Wessex region located sites too.	Standalone option - combined into scenario
1.05	Smart metering - progressive compulsory household roll out - 90% by 2050	Compulsory smart metering of 90% of household customers, achieved by 2050. This assumes that we can't penetrate all 100% of households due to shared supplies, unmeterable properties and void locations. Environmental impact from new meters in embedded carbon, but likely to lead to reduction in water usage over their lifespan, which also reduces water production costs (chemicals and energy).	Standalone option - combined into scenario

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
1.06	Smart metering - progressive compulsory NHH roll out - 90% by 2050	Compulsory smart metering of 90% of non-household customers, achieved by 2050. This assumes that we can't penetrate all 100% of properties due to shared supplies, unmeterable properties and void locations. Environmental impact from new meters in embedded carbon, but likely to lead to reduction in water usage over their lifespan, which also reduces water production costs (chemicals and energy).	Standalone option - combined into scenario
1.07	Smart metering - progressive compulsory household roll out - 90% by 2035	Same as option 1.05, but at a faster pace. Scores higher in screening based on lead time. Same cost, but over a shorter time frame would lead to higher customer bills, but then slightly offset by lower usage.	Standalone option - combined into scenario
1.08	Smart metering - progressive compulsory NHH roll out - 90% by 2035	Same as option 1.06, but at a faster pace. Scores higher in screening based on lead time. Same cost, but over a shorter time frame would lead to higher customer bills, but then slightly offset by lower usage.	Standalone option - combined into scenario
2.01	Optional standard metering enhanced promotion	Option was rejected due to the impact of covid on HH water use and our decreased ability to encourage people working from home more to switch to a meter. Generally, if people are at home more, they'll want to minimise their costs. Included it in current WRMP, but very difficult to accurately model the uplift impact of promotions.	Uncertainty - yield
3.03	Smart metering - progressive optional household roll out	Similar to options 1.05 and 1.07 but roll out is much slower due to being optional by the customer. Yield benefit is therefore much lower. More promotable to majority of customers, maybe feels like we're waiting for Gov to make meters mandatory (like in rest of Europe).	Uncertainty - yield
3.04	Smart metering - progressive optional NHH roll out	Similar to options 1.06 and 1.08 but roll out is much slower due to being optional by the customer. Yield benefit is therefore much lower. More promotable to majority of customers, maybe feels like we're waiting for Gov to make meters mandatory (like in rest of Europe).	Standalone option - combined into scenario

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
3.01	Increasing meter reading frequency from six monthly to monthly - households	Not really feasible unless we upgrade metering from visual reads to automatic reads. Could combine with option 1.03 to trial throughout 2025-2034? Would need to incorporate 'back office' costs if data/bills will be provided on a monthly basis. May be more cost beneficial to switch to full AMI instead of just AMR? Unlikely to change customer water consumption, would just keep them slightly more up to date.	Constraints - feasibility
3.02	Increasing meter reading frequency from six monthly to monthly non-households	Not really feasible unless we upgrade metering from visual reads to automatic reads. Could combine with option 1.03 to trial throughout 2025-2034? Would need to incorporate 'back office' costs if data/bills will be provided on a monthly basis. May be more cost beneficial to switch to full AMI instead of just AMR? Unlikely to change customer water consumption, would just keep them slightly more up to date. Scores lower than option 3.01 based on yield, but important to trial with both HH and NHH customers.	Constraints - feasibility
4.01	Standard change of occupier household metering	Standalone option rejected, combined with water efficiency in customer demand management scenarios.	Standalone option - combined into scenario
4.02	Smart metering - progressive household roll out for new change of occupier only	Standalone option rejected, combined with water efficiency in customer demand management scenarios.	Standalone option - combined into scenario
5.01	Household water efficiency free pack for self installation	Option was rejected upon review due to the difficulty in quantifying the uptake from customers. Only likely to appeal to a small subset of customers, and therefore not very reliable on a large scale. Could also be considered baseline as part of our water efficiency promotions, available to those customers who seek it out.	Uncertainty - yield
5.02	Online digital engagement for Smart metering	This option is likely to be rejected on it's own, and linked to smart metering options 1.01, 1.02, 1.03, 1.04 etc. No point in having an online tool for smart metering if we don't take smart metering forward at this stage.	Standalone option - combined into scenario

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
5.03	Water efficiency programmes targeted at specific groups (e.g. community, religious groups)	Option rejected as it's difficult to ensure equal advantages for all communities and groups. Society is quite divided as it is at the moment, and there is a potential risk of reputational damage from targeting specific communities or religious groups.	Uncertainty - promotability
5.04	Targeted incentives scheme - Individual customer/community reward scheme linked to reduced water use	Option rejected as it would only be viable to communities with high smart metering uptake, which has uncertainties. Also likely to highlight the inequalities between households, as it would only benefitting those that are able to spend more on additional water saving appliances.	Uncertainty - promotability
5.05	Sector specific water efficiency advice e.g. partnerships with holiday rental companies Airbnb.	Option rejected as it relies on the customers/ accommodation providers being incentivised to be able to make change, if successful it would provide a benefit to both themselves (e.g. attracts more customers) and the water company. Possibly better suited in future AMPs when smart metering network more developed	Uncertainty - yield
5.06	Water saving business visits - level 1	Option rejected to focus on bigger savings from similar options for business visits 5.09 and 5.10. Collaboration with water retailers and large businesses to improve awareness of water usage would be good, but more worthwhile aiming for larger savings.	Standalone option - combined into scenario
5.07	Rewards to water retailers for business water use savings.	Option rejected upon review due to the uncertainty around the level of reward that would be required, and how the water retailers would incentivise NHH users to make water savings. A one-off payment is unlikely to maintain savings long-term, customers would claim the rewards and go back to their usual ways.	Uncertainty - yield
5.08	Third Party - App for customer engagement	Option rejected as it's very similar to 5.02. In future, a third-party app could be developed with a smart metering tool. Yield reductions are very dependent upon smart metering on a large scale or more frequent meter readings.	Uncertainty - yield

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
6.01	Home Check - Level 1	Option rejected at this stage, to favour similar option of 6.03 which targeted bigger demand savings. Fairly low impact on environment, flexible and scalable, but demand reduction is likely to be greater if a meter is installed as well.	Uncertainty - yield
7.01	Appliance subsidies (rebates for water efficient devices and appliances)	Option rejected as this option would unfairly favour customers which are able to afford more modern appliances, and all the other customers end up subsidising them to save more money.	Uncertainty - promotability
7.02	Appliance exchange schemes	Option rejected as it is similar to 7.01, unfairly subsidising customers able to afford newer appliances in the first place. Would be more costly to Wessex than other efficiency options which haven't progressed. Could also open Wessex up to liability claims if an appliance is faulty.	Uncertainty - promotability
7.03	Plumbers' installation of water efficient goods (e.g. dual flush toilets low flush toilets, tap inserts)	Option rejected as this would be better when linked together with a household efficiency visit (6.01, 6.02, 6.03). Greater overall savings from each visit, identifying leaks and installing water efficient devices in one go.	Uncertainty - yield
7.04	Grey water recycling retrofitting to existing properties.	Option rejected as it would be very expensive to implement upon a regional scale. Would need a large customer uptake to be beneficial, most likely driven from government policy (subsidised nationally).	Uncertainty - cost
8.01	Pay per use appliances (e.g., Miele bundles subscription)	Option rejected as it would likely have unfair impacts those with large families, or with jobs requiring more clothes washing (NHS staff). Wessex would also need to set up partnership with manufacturers for pay per use scheme.	Uncertainty - promotability
8.02	Leaky Loos' Wastage Fix: large scale targeted fixes	Option rejected as it would be dependent upon smart meter installation to highlight leaking loos more precisely. There would be a high cost of plumber's time, and it also blurs the line between customer and water company ownership and responsibility of household appliances.	Uncertainty - yield

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
8.03	Partnerships/targeting of large/small developers to install water efficient devices	Option rejected as it would be difficult to always ensure implementation, without making this a legal requirement/building regulation. Likely to need government or council intervention to make mandatory. If expanded to include installation of rainwater harvesting, could group with 10.01.	Uncertainty - requires government intervention
8.04	Water retailer save	Option rejected due to uncertainties over how a third-party water retailer could take on the ownership of water management in large scale developments. It's likely they would need to set up their own estate management company. Efficiency savings of the same scale are more achievable from other options.	Constraints - feasibility
8.05	Targeted water efficiency information/advice for designer of hot water systems and purchasers of water using appliances	Option rejected as designers of hot water systems are unlikely to voluntarily adopt changes which would impact their profits. Likely that any change of this kind would require government intervention to set new water appliance standards.	Uncertainty - requires government intervention
8.06	Reducing infrastructure connection charge for properties built to a high water efficiency standard	Option rejected as there is nothing to stop occupants switching to non-water efficient fittings/appliances after receiving the reduced connection charge, and therefore losing the water savings initially established. Rainwater harvesting / grey water system will require regular professional maintenance, opening up a new aspect of Wessex Water.	Uncertainty - yield
8.07	Interest free loans	Option rejected as it is not very promotable, favouring customers who are already on a meter. High costs associated with this, and blurs to lines of appliance ownership between customer and water company. Better for the government to impose minimum water fitting standards.	Uncertainty - promotability
8.08	Water labelling - with minimum standards	Option rejected as it would likely require persistent industry wide action to bring change to Building Regulations, and government intervention. Good idea in principle, but outside of Wessex control.	Uncertainty - requires government intervention

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
8.09	Water labelling - with no minimum standards	Option rejected as it would likely require persistent industry wide action to bring change to Building Regulations, and government intervention. Good idea in principle, but outside of Wessex control.	Uncertainty - requires government intervention
8.1	New development standards - water neutrality	Option rejected as without government policy in place it would be very challenging to implement water neutrality to new developments. Requires government intervention or a change to building regulations.	Uncertainty - requires government intervention
8.11	New home standards - mandatory	Option rejected as it would likely require persistent industry wide action to bring change to Building Regulations, and government intervention. Good idea in principle, but outside of Wessex control.	Uncertainty - requires government intervention
8.12	Combined research into reducing water demand	Option rejected as it isn't really a WRMP option to help reduce demand. Better suited as a regional WCWRG exploration into new technology and campaigns.	Uncertainty - yield
8.13	Supplementary or alternative non-PWS supply	Option rejected as it would be better incorporated into supply-side option developments, rather than stand-alone scheme. Likely to be expensive to fund a team to actively search for alternative supplies across the region, with low yield return for the money spent.	Uncertainty - cost
8.14	Reuse treated wastewater effluent as an alternative supply. This reclaimed water could be used for industrial/commercial use rather than potable water (drinking water).	Option rejected as it would be difficult to roll out regionally. Some large industrial consumers might benefit, but the main obvious options have been included as supply schemes (37.07).	Constraints - feasibility
8.15	Support agricultural users or large users of mains supply during peak periods, to develop storage facilities	Option rejected due to the uncertainties over the demand savings this would actually generate, and whether it outweighs the high initial costs of the storage facilities. Unlikely to be very promotable due to the case-by-case implementation and significant strategic planning required.	Uncertainty - promotability

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
8.16	A third party takes ownership for water management of new large scale commercial developments driving down demand by integrating water efficiency and water conservation in to new build.	Option rejected due to uncertainties over how a third-party water retailer could take on the ownership of water management in large scale developments. It's likely they would need to set up their own estate management company. Efficiency savings of the same scale are more achievable from other options, and likely more reliable in other options too.	Constraints - feasibility
8.17	Third party - aerial camera survey to identify unmetered usage	Option rejected as the promotability would be very low, with Wessex being seen as 'spying' on customers. Operationally carbon intensive by using a plane for camera surveys throughout the summer months, and the demand reduction is not likely to be great.	Uncertainty - promotability
9.01	Increasing block tariffs	Option rejected as it is dependent upon all customers being smart metered. Not very promotable either, as customers won't want to be charged more than they already are	Uncertainty - promotability
9.02	Resource availability tariffs	Option rejected as it is not very promotable. Customers would feel like EA and water companies are controlling their water price even more to suit their needs. Likely to need smart metering network to reduce meter reading requirements from field staff.	Uncertainty - promotability
9.03	Variable tariffs	Option rejected as it is not very promotable, and could impact different parts of society more greatly than others (e.g., shift workers lose out). Smart metering would be a requirement before this is feasible.	Uncertainty - promotability
9.04	Consumption tariff	Option rejected as it is not very promotable, and could impact different parts of society more greatly than others (e.g., those who use greater volumes of water due to medical reasons or work requirements). Smart metering a requirement before this is feasible	Uncertainty - promotability
9.05	Seasonal tariffs	Option rejected as it is not very promotable and could impact different parts of society more greatly than others. Smart metering a requirement before this is feasible	Uncertainty - promotability

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
9.06	Community reward tariff	Option rejected as the expectation that a reward-based initiative to lead to a regional saving is naïve. Not very promotable, as will likely only highlight the inequalities between certain communities. Also requires a high uptake of smart metering in communities.	Uncertainty - yield
9.07	Drought awareness tariff	Option rejected as it is not very promotable telling customers to cap their water usage. Already promote similar themes during dry weather events. It could also impact different parts of society more greatly than others (e.g., those who use greater volumes of water due to medical reasons or work requirements)	Uncertainty - promotability
9.08	Individual reward tariff	Option rejected as the expectation that a reward-based initiative to lead to a regional saving is naïve. Not very promotable, as will likely only highlight the inequalities between certain communities. Also requires a high uptake of smart metering to build comparisons across areas.	Uncertainty - promotability
9.09	Penalty charge tariff	Option rejected as it is not very promotable telling customers to cap their water usage. Already promote similar themes during dry weather events. It could also impact different parts of society more greatly than others (e.g., those who use greater volumes of water due to medical reasons or work requirements)	Uncertainty - promotability
9.1	Transparent charging	Option rejected as it is unlikely to have customer support whilst utilities are privately owned.	Uncertainty - promotability
9.11	Trading	Option rejected due to low promotability. Likely this will unfairly discriminate against those who can't afford to buy up a large 'water allowance' despite needing it for their job or medical reasons.	Uncertainty - promotability
9.12	Lower charges for major customers with a significant water resource storage	Option rejected as it unfairly favours businesses that have access to alternative supplies and also raises questions over how sustainable these alternatives might be.	Uncertainty - promotability

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
9.13	Interruptible industrial supplies tariff	Option rejected as it unfairly favours businesses that have access to alternative supplies and also raises questions over how sustainable these alternatives might be.	Uncertainty - promotability
9.14	Benchmarked rising block business tariffs	Option rejected due to uncertainties over whether the benchmarked base would be truly representative of normal use. Also, unlikely that customers would appreciate higher bills after a period of lower rates.	Uncertainty - promotability
9.15	Industrial spot pricing	Option rejected as changing of prices due to resources at short notice is unpromotable. Customers can't control the water resource position and would feel unfairly punished for low rainfall.	Uncertainty - promotability
9.17	Non-essential use bans	Option rejected and not including within the plan due to economic impact of the option	Uncertainty - promotability
9.18	Reduced levels of service and rota cuts	Usage bans - screened through automatically	Constraints - feasibility
10.01	Rainwater harvesting is included in new developments to meet planning conditions - community developments	Option rejected due to challenging implementation and uncertainty regarding uptake among customers and unfairly distributed benefits of reduced bills for only a small number of customers.	Constraints - feasibility
10.02	Home retrofit of rainwater harvesting	Option rejected as it would be very difficult to retrofit current housing stock with rainwater harvesting, especially as customers could save more money from retrofitting with better insulation or heating improvements. Ownership and maintenance of retrofitted systems could be hard to manage.	Constraints - feasibility
10.03	Rainshare - Communities direct harvested rainwater into a centralised shared resource	Option rejected due to the uncertainty over uptake. It is also not very promotable, as it would only benefit a small number of customers. This type of scheme would be more effective at a community rather than property level. Suitability across housing stock ranges greatly.	Constraints - feasibility

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
10.04	Rainwater harvesting is included in new developments to meet planning conditions - commercial/public sector developments -single or multiple	Option rejected due to uncertainty over the level of commercial buy-in and likely savings that can be made. Likely to need government intervention to make this mandatory, with dedicated workforce to install and maintain the systems.	Uncertainty - requires government intervention
10.05	Rainwater harvesting feasibility assessment and/or subsidised installation - target large water users	Option rejected due to uncertainty around general uptake and long-term savings that could be made regarding rainwater harvesting. This option would be better if combined with offering the subsidies that follow on installation if viable, rather than just the feasibility assessment - therefore could be combined with 10.01	Uncertainty - cost
10.06	Rainwater harvesting - target large water users	Option rejected as it is unlikely commercial users will buy into rainwater harvesting without first performing a feasibility study. High costs for little rewards.	Uncertainty - cost
10.07	Rainwater harvesting - agriculture sector	Option rejected due to the challenging nature of large-scale implementation across the agricultural sector, and uncertainty regarding uptake and savings that could be made.	Constraints - feasibility
11.01	Business Efficiency Visits (BEV) - water efficiency audit - in person audit, fix and retrofit, targeted at specific sectors/businesses	Option rejected as it would need to be combined with smart metering installation to obtain significant demand savings. The reliability of this as an option and the water company's influence would dramatically reduce when going through water retail companies required to access non-household customers.	Standalone option - combined into scenario
11.02	Business Efficiency Visits (HEV) - water efficiency audit - in person audit targeted at specific sectors/businesses	Option rejected as it would need to be combined with smart metering installation to obtain greater demand savings. Yield benefit does not prove significant enough to warrant the lead time.	Standalone option - combined into scenario
11.03	Business Efficiency Visits (HEV) - leakage detection - in person targeted at specific sectors/businesses	Option rejected upon review, due to the reliability of this as an option to reduce demand, and the water company's influence would dramatically reduce when going through water retail companies required to access non-household customers. Yield benefit is not significant for such lead-time.	Uncertainty - yield

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
11.04	Business Efficiency Visits (HEV) - process water efficiency audit/leakage detection - in person targeted at agriculture sector	Option rejected upon review, due to the reliability of this as an option to reduce demand, and the water company's influence would dramatically reduce when going through water retail companies required to access non-household customers.	Uncertainty - yield
11.05	Business Efficiency Visit (BEV) - process water efficiency audit/leakage detection.	Option rejected upon review, due to the reliability of this as an option to reduce demand, and the water company's influence would dramatically reduce when going through water retail companies required to access non-household customers. Yield benefit is not significant for such lead-time.	Uncertainty - yield
11.06	Business Efficiency Visit (BEV) - water efficiency audit/leakage detection - in person targeted at leisure sector (golf)	Highest potential saving of business visit options. Difficult to impose outside of peak demand periods, and golf courses might be against Wessex interference as they are usually busiest in the summer.	Uncertainty - yield
11.07	Virtual Business Efficiency Visit (VBEV) - water efficiency audit with free water efficient devices	Option rejected as it would need to be combined with smart metering installation to obtain greater demand savings. Yield benefit does not prove significant enough to warrant the lead time.	Uncertainty - yield
12.01	Active Leakage Control	Likely to be a low impact on landscape or environment as assets/pipes are pre-existing, if anything it should lead to a benefit from reduced leakage. Active leakage control is flexible and scalable, with different options or demand reductions available.	Standalone option - combined into scenario
13.01	Leakage Driven Asset Renewal	Likely to be a low impact on landscape or environment, if anything it should lead to an environmental benefit from reduced leakage. Flexible with plenty of options to scale up renewals as desired.	Standalone option - combined into scenario
13.02	Leakage Driven Asset Renewal - service reservoirs	Option rejected due to the low demand reduction compared to high costs. Fairly impact on landscape and environment as assets/pipes are pre-existing.	Standalone option - combined into scenario
14.01	Smarter network monitoring	Likely to have a fairly low impact upon the environment, compared to supply schemes of similar yield. Flexible, and scalable with loggers, meters and sensor installations as per desired amount.	Standalone option - combined into scenario

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
14.02	Customer Side Leakage Repairs	Screened through for further assessment. Promotable with customers, and could raise awareness of water usage in parallel to organising the leak repairs	Standalone option - combined into scenario
15.01	Leakage driven pressure management - network reconfiguration	Low impact on landscape or environment as assets/pipes are pre-existing. Can be flexible and the scale of changes can be adjusted to suit Wessex needs.	Standalone option - combined into scenario
15.02	Leakage driven pressure management - CALM networks	Low impact on environment as infrastructure already in place. Network adjustments required but will come with lower embedded carbon than supply schemes.	Standalone option - combined into scenario
16.01	Trunk main leakage reduction	Low impact upon the environment. Feasibility of tech and ops is currently unknown. Will aim to provide cheaper alternatives to current leakage detection techniques.	Standalone option - combined into scenario
17.01	Leakage technology investments	Investing in leakage technologies and trialling them in AMP, providing a basis for larger scale future investments.	Standalone option - combined into scenario
17.02	Leak Free Mains	Utilising improved infrastructure technology on new housing and commercial developments. Will help to maintain a lower leakage rate in future years	Standalone option - combined into scenario
18.03	Malmesbury to Chippenham to Bath transfer upgrade	Option rejected after funding acquired within 2020-2025 AMP to complete Malmesbury to Chippenham pump upgrades and inlet pipework. Current 21" AC main has capacity to utilise Malmesbury surplus.	Uncertainty - source
18.04	North Grid to North transfer upgrade	Option rejected in favour of a larger, combined scheme (18.26). It would be dependent on increasing the Bristol to Bath transfer. Could use current pipework infrastructure, to decrease environmental impact.	Option combined upon review

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
18.05	Melksham to Devizes new connection	Option rejected. Would need to be grouped with 18.12 and 18.07. New pipe infrastructure required and could connect to Bowden to Devizes main to reduce excavation in SSSI near Devizes. But likely more environmental impact than upgrading Bowden to Devizes main, with more construction requirements and a larger elevation gain (more embedded and operational carbon).	Option combined upon review
18.06	South Bath to North Bath New Connection	Option rejected to combine into a larger supply scheme that includes increasing Bristol to Bath import. As a standalone option, could technically be done, despite environmental concerns and a potentially complex pipe routing, but no guarantee of supply to make it worthwhile in peak week without Bristol import being increased. Pipeline routing would need to try and avoid designated sites, but a service reservoir in Corsham is itself is in a SSSI and SAC (same risk if burst main, this work would be more planned). Also need to consider river, rail and road crossings.	Option combined upon review
18.07	Bristol to Bath transfer increase	Option rejected as a standalone, instead being combined with other options to create larger supply schemes. Pipework already in place, agreement between companies to increase transfer during drought scenarios. Pumps capable of 6Ml/d each, may need to increase pipe capacity within Wessex region. Linked to option 18.12, which is likely to be required first to enable the additional water to be used.	Option combined upon review
18.08	Frome (Bristol Water) to Wessex Grid connection	Option rejected due to the risk of uncertainty of supply from Bristol at this time. More likely that the Bristol import to Wessex at Bath would be increased, rather than constructing a new transfer with more embedded carbon.	Alternative options with lower impact
18.11	South Bath Source transfer upgrade I	Option rejected as drought yield isn't guaranteed to be greater than the current restriction on this transfer. Treatment upgrade of a water treatment works in Bath itself may be required before it's worthwhile reinforcing the pipework too.	Uncertainty - yield

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
18.12	South Bath to Trowbridge transfer upgrade	Option rejected and grouped together to form a larger supply scheme, which is sourced by increasing Bristol to Bath import. Pipeline already in place here, and is already bi-directional, so embedded carbon of this leg would be low.	Option combined upon review
18.13	Bristol Import to North Bath transfer upgrade	Option rejected as it doesn't create any new water and would be dependent upon Bristol to Bath import increasing. If this does increase, the additional supply would be better utilised elsewhere in the system.	Uncertainty - yield
18.14	Malmesbury to Chippenham transfer reversal	Option rejected. It is dependent on Bath to Corsham being installed and would counteract the Malmesbury to Chippenham increased transfer pre-2025, as we wouldn't need to use both Malmesbury and Bath to support the Chippenham area.	Uncertainty - dependencies
18.15	Amesbury to Upavon transfer upgrade	Option rejected as a standalone and combined 18.21 to create a broader Pewsey resilience option, sourced from Amesbury.	Option combined upon review
18.16	North Weymouth network automation	Option rejected as a standalone, and combined with 38.09, as would be dependent upon that being completed.	Option combined upon review
18.17	Wylye valley source transfer upgrade I	Option rejected as it would not benefit or critical peak periods. More useful for resilience and outage planning at a water treatment works near Warminster.	Uncertainty - peak benefit
18.18	Yeovil transfer upgrade	Standalone option rejected and grouped together into larger options to reduce multiple dependencies. Majority of infrastructure already in place, could need new pump station to link reservoirs together. Designated sites avoided.	Option combined upon review
18.19	Charminster to Dorchester transfer reversal	Standalone option rejected, and grouped together with others (18.20, 21.06, 23.01) to reduce multiple dependencies. Pipeline routing would follow current system, avoiding designated sites.	Option combined upon review

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
18.2	East West Main reversal	Standalone option rejected, and grouped together with others (18.19, 21.06, 23.01) to reduce multiple dependencies. Pipeline routing would follow current system, avoiding designated sites.	Option combined upon review
18.21	Pewsey network upgrade	Option rejected as standalone and combined with 18.15 to create a broader Pewsey resilience option, sourced from Amesbury. Dependent upon outcome of investigations at Leckford. If we can't use Leckford, then more water will be required to meet demand in Pewsey, so this option would be necessary.	Option combined upon review
18.22	Holton Heath transfer upgrade	Option rejected due to mains replacement required and embedded carbon of this. Bigger yield gains from other options in the area, and would be dependent upon multiple other options 18.19, 18.20, 21.06.	Uncertainty - dependencies
18.23	South Bath Source transfer upgrade II	Option rejected as EA considering potential licence reduction 2025. Averaging 3-3.5Ml/d in 2021. Current max licence 6.82Ml/d, current daily licence 4.55Ml/d.	Uncertainty - yield
18.24	Nadder Valley Source transfer upgrade	Option rejected because of low yield benefit to likely cost. Could be considered in future with greater certainty around Salisbury licences. These network improvements would help with additional demand, but it brings only a very small yield increase.	Uncertainty - yield
19.01	Bridgwater (Wessex) to Burnham (Bristol)	Option rejected due to WQ risk between water companies, and negative yield to Wessex. Would need to be part of regional planning scenario, and Wessex could use additional water from Bridgwater for their own purposes.	Uncertainty - yield
19.02	West Country Southern Water Transfer - SWW Reservoir	Option rejected, as route is less preferable than 19.03 (to Tiverton), impacting more designated sites	Environmental impact - emissions

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
19.04	SWW Reservoir Pump Storage - Increase in Wessex water take from Shared Reservoir	Option rejected after consultation with SWW. Large pumping costs from SWW Reservoir to water treatment works near Taunton would rule this option out compared to other similar options. Pumped storage is a risk to INNS, would require mitigation in place.	Uncertainty - cost
19.05	Pumped storage: Bristol Avon	Option rejected on its own but included as part of new reservoir options. Pumped storage is a risk to INNS, would require mitigation in place, and licence would likely need reviewing form EA.	Option combined upon review
19.08	Severn-Thames Transfer: WCWRG only at 45Ml/d	Offered to Wessex from UU and Bristol. Further discussions needed in future. Possible implications on Severn Estuary designated area. Relatively low carbon usage due to using natural transfer of river.	Uncertainty - cost
19.09	Severn-Thames Transfer: WCWRG only at 75Ml/d	Offered to Wessex from UU and Bristol. Further discussions needed in future. Possible implications on Severn Estuary designated area. Relatively low carbon usage due to using natural transfer of river.	Uncertainty - cost
19.12	Severn-Thames Transfer: multiple receivers at 45Ml/d	Offered to Wessex from UU and Bristol. Further discussions needed in future. Possible implications on Severn Estuary designated area. Relatively low carbon usage due to using natural transfer of river.	Uncertainty - cost
19.13	Severn-Thames Transfer: multiple receivers at 75Ml/d	Offered to Wessex from UU and Bristol. Further discussions needed in future. Possible implications on Severn Estuary designated area. Relatively low carbon usage due to using natural transfer of river.	Uncertainty - cost
20.01	Transfer from SWW-Bournemouth to WW	Option rejected as a standalone option, considering SWW deficits in Bournemouth area. To be considered as part of other options (water recycling and licence relocation) in the lower Stour or lower Avon areas.	Option combined upon review
20.02	Tankering of water	Option rejected. High carbon usage from travel (currently) and large social impact from tankering journeys. Likely high costs for the yield gained.	Constraints - feasibility

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
21.01	Calne Sources new transfer I	Option rejected due to low yield potential, dependencies on mothballed sites returning and impact upon designated and non-designated sites. Greater infrastructure requirements, with embedded carbon, than other options for similar benefits.	Option combined upon review
21.02	Calne Sources new transfer II	Option rejected due to requirement/dependency of a source near Calne being returned.	Uncertainty - dependencies
21.03	Western Arm Sources new transfer	Standalone option rejected, with broader option considered for Pewsey resilience. More infrastructure required than other options for same deficit, and greater number of dependencies.	Option combined upon review
21.04	Sturminster Newton network extension	Option rejected. Low yield benefit during annual average conditions, and likely not able to meet increased demand during critical period with stream support requirements and new licence in 2025.	Uncertainty - yield
21.06	Yeovil to Dorchester area new transfer	Standalone option rejected, due to multiple dependencies and complex planning. Combined into broader options (with 18.18, 18.19, 18.20), with the dependencies included.	Option combined upon review
21.07	North West Somerset Non-Household transfer	Option rejected as more infrastructure requirements, and therefore more embedded carbon and environmental impacts, than other options to utilise Bridgwater surplus.	Uncertainty - yield
21.08	Sherborne network upgrades and new connections	Option rejected due to high carbon from mains materials compared to low annual average yield benefit, and minimal or no critical period benefit due to yield at Water Treatment Works near Yeovil	Uncertainty - yield
22.01	West Dorset Source new connections	Option rejected as the yield gain is not relevant on a regional scale, despite a low environmental impact from the option.	Uncertainty - yield

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
24.01	Rainwater harvesting	Option rejected due to concerns over water quality. Rainwater harvesting systems likely to cost a lot from a maintenance point of view, and open Wessex up to liability issues. Supply side scheme, different to customer option. Requires regulator, government and council backing	Uncertainty - water quality
24.02	Rain cloud seeding	Option rejected. Not promotable to try and control the weather, and likely to have large environmental impacts. Better suited for option to be actioned by government, not individual water companies.	Uncertainty - promotability
24.03	Iceberg imports	Option rejected. Not promotable to try remove icebergs from Artic area, with multiple negative impacts to the environment (ecological, carbon intensive).	Environmental impact - emissions
26.01	Blashford Lakes: release into River at Ringwood	Option rejected. In an area where little or no abstraction is available in low flow conditions. Not enough storage potential to be used as winter storage for supplying stream supports to Avon in summer months. Would impact SSSI/Ramsar sites downstream in the Avon.	Environmental impact - water body
26.02	Blashford Lakes: release into the River at Salisbury	Option rejected. In an area where little or no abstraction is available in low flow conditions. Not enough storage potential to be used as winter storage for supplying stream support to Avon in summer months. Would impact SSSI/Ramsar sites downstream in the Avon.	Environmental impact - water body
26.03	Blashford Lakes: potable supply into Wessex network	Option rejected. In an area where little or no abstraction is available in low flow conditions. Not enough storage potential to be used as winter storage for supplying stream supports to Avon in summer months. Would impact SSSI/Ramsar sites downstream in the Avon.	Environmental impact - water body
26.04	Direct River Abstraction - Bristol Avon (South Bath)	Option rejected. No storage here so would not be drought resilient abstraction, and scheme would not provide any flexibility. High level of treatment required. Likely to be challenged by locals. Possibly useful if local service reservoir developed (32.04)	Uncertainty - water quality

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
26.05	Direct River Abstraction - Bristol Avon (West Bath)	Option rejected. Likely would need some sort of storage to make this viable, licence better used for pumped storage to a new reservoir. Limited flexibility and negative customer feedback likely, mainly related to the WTW. High levels of treatment required - without bankside storage significant variability in WQ may have significant impact on the 5 or 6 stages of treatment required.	Uncertainty - water quality
26.06	Reinstatement of mothballed sources - Shaftesbury	Option rejected following review meeting with EA in Dec 2021. Much of mothballed site has been removed. No deterioration assessment required before abstraction again.	Environmental impact - water body
26.07	Reinstatement of mothballed sources - Minehead	Option rejected follow review meeting with EA in Dec 2021. Bringing back in will have significant deterioration at low flows; would change from compliant to band 1. EA would have concern on this. Until 1 in 500 modelling has been done, not sure whether this is an area that WW need water.	Environmental impact - water body
26.08	Reinstatement of mothballed sources - East Calne	Option rejected following review meeting with EA in Dec 2021. Significant impact at low flows (Q95), moving from compliant to band 1. EA would require flow conditions on licence if brought back into supply. Land sold, may need to move licence elsewhere in catchment and change source type	Environmental impact - water body
26.09	Reinstatement of mothballed sources - North West Dorset	Option rejected following review meeting with EA in Dec 2021. At low flows (Q95) abstraction would move waterbody from compliant to band 1. Located on tributary of Yeovil reservoir, so the flow is captured in storage anyway.	Environmental impact - water body
26.1	Reinstatement of mothballed sources – East Chard	Option rejected as it's a very small, licenced volume, and is only currently used for supplying troughs and a few houses. Not worth the investment to bring back into potable supply.	Uncertainty - yield

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
26.11	Reinstatement of mothballed sources - Salisbury	Option rejected as assets and land have already been sold on. Previously out of supply due to nitrates and pesticides, but abstraction assumed in EA Hampshire Avon modelling. Scope to move licence elsewhere, maybe combined with 26.19 (East Salisbury) and 26.12 (East Shaftesbury).	Option combined upon review
26.12	Reinstatement of mothballed sources - East Shaftesbury	Option rejected. It's located at the top of the Nadder, could consider relocation somewhere else in the catchment following AMP7 CSMG investigations.	Environmental impact - water body
26.15	Reinstatement of mothballed sources - East Castle Cary	Option rejected due to a very low yield gain, and the EA highlighted that abstraction would likely change Brue watercourse from compliant to band 1. Possible licence relocation, but no other supply sites within close proximity.	Environmental impact - water body
26.16	Reinstatement of mothballed sources - Westbury	Option rejected as the EA have hydrological concerns with abstraction here, moving from compliant to band 1 at Q50 and band 1 to band 2 at Q95. Ecologically of less concern.	Environmental impact - water body
26.18	Reinstatement of mothballed sources - Ringwood	Option rejected as there would be no summer abstraction available. Licence is linked to Bournemouth's site, and the area is already peak constrained. Could be used as storage, but still difficult to treat. Makes more sense to not abstract here, allow Bournemouth to have full licence (or increased) and transfer potable water to Wessex Water.	Environmental impact - water body
26.19	Reinstatement of mothballed sources - East Salisbury	Option rejected on its own due to poor asset condition. Relocation of licences of East Salisbury and Salisbury mothballed sources together is included in the feasible list elsewhere.	Option combined upon review
27.01	Exmoor Reservoir licence variation: Increase summer licenced volume	Option rejected, as would need to upgrade WTW near Taunton to utilise increased licence allowance. Other more feasible options within the West area to utilise surplus within our current licences, without needing to upgrade a WTW.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
27.02	Exmoor Reservoir licence variation: Increase summer daily maximum	Option rejected, as would need to upgrade WTW near Taunton to utilise increased licence allowance. Other more feasible options within the West area to utilise surplus within our current licences, without needing to upgrade a WTW.	Alternative options with lower impact
27.03	Exmoor reservoir licence variation: Increase winter licenced volume	Option rejected as the time-limited licence increase at Exmoor reservoir is already up for review. Unlikely system benefit in a 1:500 drought due to shared usage with SWW, and increased abstraction would likely have significant environmental impacts.	Alternative options with lower impact
28.01	Optimisation of River Tone Catchment	Option rejected as turning Exmoor reservoir into a river regulating reservoir (with no PWS output) would reduce overall West region yield, despite being able to increase output downstream at Bridgwater and Taunton sites. Would need significant infrastructure changes in the network to utilise additional yield at Bridgwater, and extra yield in Taunton would currently be trapped within that WIS zone.	Environmental impact - water body
29.01	Optimisation of River Tone Catchment - Canal	Option rejected as the Canal and River Trust would want to minimise other parties water usage in a drought, so unlikely to be able to use this. A lower canal level would also have impacts socially and on tourism, as well as affecting anglers.	Uncertainty - promotability
30.01	Pump Storage Exmoor reservoir from Tone catchment	Option rejected due to the risk of INNS spreading between two reservoirs. Pumped storage transfer would allow us to maintain two reservoir levels, but we could just regulate pumped storage in Exmoor reservoir and output from Tone Reservoir in the winter period.	Uncertainty - INNS
30.03	Pump Storage - Bridgwater Reservoir	Option rejected, with pumped storage to Quantock reservoir more favourable. Capacity in licence to use surplus stream flow to top up reservoirs, but Bridgewater reservoir already has pumped storage capability from canal.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
31.01	Raise Dams - Blackdown Reservoir	Option rejected. This reservoir has a low surface area, so yield increase would be low. Located within Blackdown Hills AONB with Ancient Woodland adjacent. Significant reconfiguring of Taunton network to utilise extra output from Taunton WTW.	Uncertainty - yield
31.03	Raise Dams - Quantock Reservoir	Option rejected. Bigger footprint likely to encroach on AONB land (non-designated). Would be dependent upon pumped storage to Quantock reservoir to be worthwhile (30.02). Costs would be very high for a low annual average yield gain.	Environmental impact - land
31.04	Raise Dams - Bridgwater Reservoir	Option rejected. Large operational costs and carbon required, and lots of option dependencies, in moving water from Bridgwater to other areas of the network.	Environmental impact - emissions
31.05	Raise Dams - Tone Reservoir	Option reject. Sections of non-designated Ancient Woodland would be flooded, and there would be a lot of option dependencies and operational costs/carbon required to get water from Tone Reservoir to other areas of the network.	Environmental impact - land
31.06	Raise Dams - Exmoor Reservoir	Option rejected as it's located within Exmoor national park, with SSSI along southern bank. Dam raising would impact these areas. Lake used for social recreation	Environmental impact - land
31.07	Raise Dams - Exmoor Reservoir II	Option rejected. Location is very far from area of water need, within a national park and surrounded by designated land. Lower yield than other dam raising options, and it would require extensive infrastructure and network upgrades to utilise the additional yield.	Environmental impact - land
31.08	Raise Dams - Bristol Water	Option rejected. Bristol Water owned site, which is SSSI designated. Benefit to Wessex would be dependent upon other options being selected, via construction of new inter-company transfers or increased bulk transfers that already exist.	Environmental impact - land

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.02	New Reservoirs: Avalon Lakes Somerset Levels	Option rejected. Scheme will impact on Somerset Levels & Moors SSSI, SPA & RAMSAR. There is also uncertainty over operability of complex treatment processes, and leakage issues with reusing the abandoned peat working.	Environmental impact - land
32.04	New Reservoir: Bath	Option rejected upon review, as the minimum flow requirement in R. Avon means that water is unlikely to be abstracted during summer months. Fairly low storage capacity.	Uncertainty - yield
32.05	New Reservoir: Vobster Quarry (Mendips)	Option rejected as there is limited storage and the site is now used for other activities (swimming/diving), so significant opposition on social and promotability grounds.	Uncertainty - promotability
32.06	Impoundment of Coastal Waters – Parrett Barrage	Option rejected due to issues over water quality from nutrient loading and industrial discharges. Also planning issues surround MoD land that would be flooded from development of this option.	Uncertainty - water quality
32.07	New Reservoir: Langport	Nutscale Valley includes cSAC, SSSI, AONB and NNR as well as being within Exmoor NP and with very poor access. Previously looked at (Halcrow 1988) and found that with river regulation and new WTW at west Luccombe would give a 2% drought yield of 30 Ml/d.	Environmental impact - land
32.08	New Reservoir: Horner Hill (Exmoor)	Option rejected as Nutscale Valley includes cSAC, SSSI, AONB and NNR as well as being within Exmoor NP and with very poor access. Previously looked at (Halcrow 1988) and found that with river regulation and new WTW at west Luccombe would give a 2% drought yield of 30 Ml/d.	Environmental impact - land

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.09	New Reservoir: Pitt Bridge (Exmoor)	Option rejected as Nutscale Valley includes cSAC, SSSI, AONB and NNR as well as being within Exmoor NP and with very poor access. Previously looked at (Halcrow 1988) and found that with river regulation and new WTW at west Luccombe would give a 2% drought yield of 30 Ml/d.	Environmental impact - land
32.1	New Reservoir: Druids Combe (Exmoor)	Option rejected as Nutscale Valley includes cSAC, SSSI, AONB and NNR as well as being within Exmoor NP and with very poor access.	Environmental impact - land
32.12	New Reservoir: Tadnoll (Frome Catchment Poole Harbour)	Option rejected as adjacent to a SSSI. Maybe geologically feasible. Potential water resource availability here under higher flow conditions. Merging this option with 32.13 could improve the economics of dam construction (currently road runs through the two).	Environmental impact - land
32.14	New Reservoir: Holwell (Dorset Stour)	Option rejected as the volume of the dam compared to its length is very low, which is unlikely to be cost effective. Rated as one of best options by consultant reports, but not the best for the Dorset Stour catchment, see option 32.15.	Constraints - feasibility
32.15	New Reservoir: Fontmell (Dorset Stour)	Standalone option rejected, with two sub-options progressing instead. Reservoir option favoured by HR Wallingford report, with best score within this catchment. Although low permeability and small dam volume, useful yield and capacity and low population downstream (low risk).	Constraints - feasibility
32.16	New Reservoir: Chivrick's (Dorset Stour)	Option rejected as there is a higher population downstream and more permeable than Fontmell (32.15), with only a slightly high yield, within same Dorset Stour catchment.	Constraints - feasibility
32.17	New Reservoir: Bibbern (Dorset Stour)	Option rejected due to its small capacity and proximity to Stalbridge village. Larger option nearby at Gibbs Marsh (32.18) with a greater capacity, and more favourable options within the Dorset Stour catchment.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.18	New Reservoir: Gibbs Marsh (Dorset Stour)	Option rejected as would need to re-route 1x road, and 2x dam sections are required, increasing the constraints on the option. But higher yield and capacity available compared to adjacent Bibbern option (32.17). Not the most preferred option in this catchment, see 32.15.	Alternative options with lower impact
32.19	New Reservoir: Thorny (Parrett)	Option rejected due to a very long bund requirement and intake from the northern river needed (diverted). Low annual refill availability. Not the most preferred option in this catchment, see 32.24.	Alternative options with lower impact
32.2	New Reservoir: Oakley (Parrett)	Option rejected due to low annual refill and high risk to population than other options in the catchment. Low bund volume required, but likely to flood? No designated land adjacent to site. In a useful network location. Option favoured by HR Wallingford report, but only a single option has been chosen in each catchment as a representative option given same source of water, see 32.24.	Alternative options with lower impact
32.21	New Reservoir: Nyland (Dorset Stour)	Option rejected due to lower storage capacity and topography not helpful, although there is a large refill potential. No rerouting of roads required, not designated land either. Option favoured by HR Wallingford report, but only a single option has been chosen in each catchment as a representative option given same source of water, see 32.15.	Alternative options with lower impact
32.22	New Reservoir: Hornsey (Parrett)	Option rejected due to low annual refill potential, low storage capacity and lower yield than other options in this catchment. Long dam that is squeezed between roads adds to constraints of this location.	Alternative options with lower impact
32.23	New Reservoir: Horsington (Dorset Stour)	Option rejected as other options in the Stour catchment scored more favourably in the consultant report. No rerouting of roads required, not in designated land. Small dam volume required, but better options within Dorset Stour.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.25	New Reservoir: Wincanton (Dorset Stour)	Option rejected due to a very long dam requirement and the adjacent flood plains. Low annual refill potential. Not the most preferred option in this catchment, see 32.15.	Alternative options with lower impact
32.26	New Reservoir: Ham (Dorset Stour)	Option rejected due to proximity of Gillingham town to the location. Technically feasible, but a higher consequence of dam failure than other options. Low annual refill potential. Not the most preferred option in this catchment, see 32.15.	Alternative options with lower impact
32.27	New Reservoir: Bow (Dorset Stour)	Option rejected as located next to a floodplain and the topography is not helpful. Not the most preferred option in this catchment, see 32.15.	Alternative options with lower impact
32.28	New Reservoir: Yarcombe (Parrett)	Option rejected as a long dam is required and there is a small upstream catchment. Poor quality lowland and uncertain water resource value, likely to need extensive treatment.	Alternative options with lower impact
32.29	New Reservoir: Back (Parrett)	Option favoured by HR Wallingford report and selected as alternative option in the Parrett (Yeo) catchment with potential water from Brue also, depending on environmental constraints. Longish dam, surrounding farms roads but good catchment	Alternative options with lower impact
32.3	New Reservoir: Hornblotton (Brue Axe)	Option rejected as location is far from Wessex' area of deficit, despite being favoured by consultant’s report. Helpful topography, and EA mentioned reservoirs in Brue could provide useful management of river systems.	Alternative options with lower impact
32.31	New Reservoir: Rowbury (Bristol Avon)	Option rejected as there is a small catchment and is close to a railway. Long dam requirement, despite it being shallow. Not selected as preferred single representative option for the Bristol Avon catchment, see option 32.36.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.32	New Reservoir: Semington (Bristol Avon)	Option rejected. Geological faults run through the footprint of the potential reservoir. Long dam, shallow, and close to farms. Not selected as preferred single representative option for the Bristol Avon catchment, see option 32.36.	Alternative options with lower impact
32.33	New Reservoir: By the Mill (Bristol Avon)	Option rejected due to proximity of village next door, which results in a tight area of the dam footprint and construction, whilst also reducing the refill potential by limiting pumping availability. Not selected as preferred single representative option for the Bristol Avon catchment, see option 32.36.	Alternative options with lower impact
32.34	New Reservoir: Silverlands (Bristol Avon)	Option rejected with powerlines and roads constraining the dam footprint, which would ned to be bunded the whole way round. Pumped intake from R. Avon would be needed. Not selected as preferred single representative option for the Bristol Avon catchment, see option 32.36.	Alternative options with lower impact
32.35	New Reservoir: Cocklemore (Bristol Avon)	Option rejected as preferred option in the catchment identified 32.26, but a good back up. Long dam, pumped input from R. Avon. Can be a higher dam, no downstream low flow support need.	Alternative options with lower impact
32.37	New Reservoir: Cade Burma (Bristol Avon)	Option rejected due to proximity of SSSI reach along the R. Avon. Long bund, need pumped input from Avon. No downstream flow support need. Not selected as preferred single representative option for the Bristol Avon catchment, see option 32.36.	Alternative options with lower impact
32.38	New Reservoir: Chissell (Bristol Avon)	Option rejected as there are preferred reservoir locations within the Bristol Avon catchment (see option 32.36). Chissel would require a long dam to entirely bund the reservoir. Small, need pumped input from Avon. No downstream flow support need.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.39	New Reservoir: Sutton Benger (Bristol Avon)	Option rejected as there are preferred reservoir locations within the Bristol Avon catchment (see option 32.36). Sutton Benger had a small catchment and long dam. Would need pumped intake from Avon, but no downstream resource need.	Alternative options with lower impact
32.4	New Reservoir: Dauntsey (Bristol Avon)	Option rejected as there are preferred reservoir locations within the Bristol Avon catchment (see option 32.36). Topography helpful but need to check geology carefully (close to Hullavington - is it limestone? Will it leak? Also support already exists from GW - will SW storage help?	Alternative options with lower impact
32.41	New Reservoir: Gauze (Bristol Avon)	Option rejected as there are preferred reservoir locations within the Bristol Avon catchment (see option 32.36). Small and long dam.	Alternative options with lower impact
32.42	New Reservoir: The Cam (Dorset Stour)	Option rejected as there are preferred reservoir locations within the Dorset Stour catchment (see option 32.15). Small reservoir and shallow.	Alternative options with lower impact
32.43	New Reservoir: Stockhill (Dorset Stour)	Option rejected as there are preferred reservoir locations within the Dorset Stour catchment (see option 32.15). Faults run through the footprint of the potential reservoir. Might need to move bridge further up valley.	Alternative options with lower impact
32.44	New Reservoir: Short Wood (Dorset Stour)	Option rejected as there are preferred reservoir locations within the Dorset Stour catchment (see option 32.15). Faults run through the footprint of the potential reservoir and footprint impacted by mining. However, good catchment and topography.	Alternative options with lower impact
32.45	New Reservoir: Huntstree (Bristol Avon)	Option rejected as there are preferred reservoir locations within the Bristol Avon catchment (see option 32.36). Small, high, good catchment and pumped store potential from Avon but upstream Bath.	Alternative options with lower impact
32.46	New Reservoir: Newton (Bristol Avon)	Option rejected as there are preferred reservoir locations within the Bristol Avon catchment (see option 32.36). Requires shifting upstream to avoid cottages and road up valley bottom.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
32.47	New Réservoir: Exe (Exe Otter Axe)	Option rejected due to large distance from area of need within Wessex network. Also located within Exmoor National park. Footprint of potential reservoir is impacted by mining. Location requires shifting upstream to avoid housing and connector road. Assume dead end track can be flooded.	Environmental impact - land
32.48	New Reservoir: Mole	Option rejected. The catchment is small, with a farm and road in the way. Moving the Dam upstream makes it much longer and less feasible.	Alternative options with lower impact
32.49	New Reservoir: Batherm (Exe Otter Axe)	Option rejected and would require reconfiguring to avoid valley head roads, but closer to a Taunton WTW than other options in the Exe catchment. However, location is far from the deficit area so not required.	Alternative options with lower impact
32.5	New Reservoir: Molland	Option rejected as it would need shifting upstream to avoid housing and roads. Dam would need to be longer and would also lose some of its refill catchment.	Alternative options with lower impact
32.51	New Reservoir: Huntsham	Option rejected. It's located within Blackdown AONB, and far from the area of deficit. Therefore, likely to be unpromotable and require significant pipework or network reconfiguration to move water to area of deficit.	Environmental impact - land
32.52	New Reservoir: Otter (Exe Otter Axe)	Option rejected. It's located within Blackdown AONB, and far from the area of deficit. Therefore, likely to be unpromotable and require significant pipework or network reconfiguration to move water to area of deficit. Also, would impact roads in the area	Environmental impact - land
32.53	New Reservoir: Whitestaunton (Exe Otter Axe)	Option rejected. It's located within Blackdown AONB, and far from the area of deficit. Therefore, likely to be unpromotable and require significant pipework or network reconfiguration to move water to area of deficit. Uncertainty around the geological feasibility.	Environmental impact - land
32.54	New Reservoir: Hazelbury Bryan (Dorset Stour)	Option rejected as there are preferred reservoir locations within the Dorset Stour catchment (see option 32.36).	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
33.02	Groundwater: Aquifer Storage Recharge – non Wareham	Option rejected as previous trials were unsuccessful, and therefore the yield uncertainty is large. Most areas previously investigated (Chippenham, Shrewton and Blashford) have either had licences reduced already or are pending licence restrictions in the future (WINEP).	Uncertainty - yield
34.01	Groundwater: Off shore groundwater	Option rejected. Only offshore aquifer is within confined chalk of Wareham basin, so option 33.01 more suitable. Creating an offshore source much more complex and would likely be located within SPA designated area.	Constraints - feasibility
34.02	Groundwater: Explore deep greensand	Option rejected as there is low confidence in technical viability of it. Likely a high risk of iron issues from greensand sources. Risk of no flow as transmissivity may not be developed within this region of aquifer.	Constraints - feasibility
34.03	Groundwater: Otter groundwater (SWW area)	Option rejected with no summer yield available within this catchment. Located within AONB too.	Uncertainty - yield
34.04	Groundwater: Yeo groundwater	Option rejected with the pipeline. Pipeline would be routed through AONB, and a likely impact upon the designated sites downstream on the moors. Also, an uncertainty around yield.	Uncertainty - yield
34.05	Groundwater: East Lulworth	Option rejected. Not explored again since 1980s testing, which proved to be detrimental to environment by lowering spring levels. Likely to fail a non-deterioration test. Would require appropriate development and infrastructure, which wouldn't be promotable within SSSI and SAC designation sites, which are also key to local tourism.	Environmental impact - water body
34.06	Groundwater: Longham	Option rejected as it would require joint management with SWW. High fluoride source requires appropriate dilution and control. BH proved useful for ASR back in studies in early 2000's. Could be used as direct abstraction, treated at WTW near Pool and then supplied back into Bournemouth and Wessex systems	Constraints - feasibility

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
34.07	Third party - hydro ecological modelling	Option rejected. It's not necessarily an option to take forward, but a good contact for future investigations surrounding river flows and hands off licences (EFI's).	Uncertainty - yield
35.01	Surface water: King Sedgemoor Drain	Option rejected. Discussions with EA indicate that in a dry summer there is no substantial flow out of KSD into River Parrett, impacting the risks and uncertainties of this option in regard to a prolonged dry period	Environmental impact - water body
36.01	Desalination: North Coast Wessex Water - Bridgwater Bay	Option rejected. Lots of designated sites within Bridgwater Bay and Severn Estuary. New technology to Wessex, although other companies have used and considering use in near future. Remineralisation required to increase water hardness.	Environmental impact - water body
36.03	Desalination: South Coast Wessex Water - Weymouth	Option rejected. SAC designated waters, SSSI designated coastline and designated bathing areas, in an area highly dependent upon tourism, so it is very unpromotable to customers and regulators.	Environmental impact - water body
37.01	Water recycling Avonmouth: IPR to Barrow Reservoir	Option rejected. Change in taste and or corrosivity in water produced by Bristol WTW. Pre-existing res so no requirement for new storage and closer to Avonmouth than Chew Valley option, but smaller capacity for re-fill from effluent. Requires RO (reverse osmosis) and concentrate disposal is prohibitively costly or complex. Environmental impacts would mainly only arise from new mains being installed for transfer.	Constraints - feasibility
37.02	Water recycling Avonmouth: IPR to Chew Valley Lake	Option rejected. Chew Valley Lake is a SSSI, and a change in taste of water produced by Bristol WTW. But a pre-existing so no requirement for new storage. RO required. Long transmission system. Environmental impacts would mainly only arise from new mains being installed for transfer.	Constraints - feasibility

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
37.03	Water recycling Avonmouth: IPR to Tor Quarry	Option rejected. It would be very dependent on Torr Reservoir being developed, with a very long transmission route required. Additional treatment at Avonmouth also needed, including reverse osmosis. Would require higher water quality to protect reservoir users.	Constraints - feasibility
37.04	Water recycling Avonmouth: IPR to Failand Quarry	Option rejected. It's the shortest main required out of all Avonmouth re-use options but is dependent upon a brand new reservoir being developed, with lots of constraints in the way. Additional treatment and reverse osmosis would be needed at Avonmouth. Need for higher water quality for reservoir users.	Constraints - feasibility
37.08	Water recycling Christchurch: IPR to River Avon	Option rejected. Additional nutrient removal required to decrease eutrophication risk in Avon. Pipe routing likely to include rail crossing and would have to navigate a range of environmentally sensitive areas. IPR could change taste of water produced by Knapp Mill	Environmental impact - water body
37.09	Water recycling - Christchurch	Option rejected, with issues relating to the pipeline route: need to navigate multiple habitats and wetlands including SACs, Ramsar sites, and SSSI; need to navigate rail crossings, 4 lane A-Road crossings and a large river crossing. Change in taste of water produced by WTW near Poole. Additional nutrient removal required to protect res near Christchurch	Environmental impact - water body
37.11	Water recycling - Taunton I	Option rejected, with the Variable or low customer demand undermining cost benefit. Reduces pollution load on the Tone, but flow diversion from the Tone likely to cause WFD deterioration at low flows (Ham is a significant proportion of this flow in dry periods).	Environmental impact - water body
37.12	Water recycling - Taunton II	Option rejected. Customer modifications required for non-potable water handling. Low customer demand would undermine cost benefit. Complex pipeline route with rail, river, canal and motorway crossings.	Constraints - feasibility

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
37.13	Water recycling - Bournemouth - SWW I	Option rejected. Holdenhurst provide majority of lower Stour flows in dry periods, so effluent diversion would result in WFD status deterioration Complex pipe routing with river and A-road crossings. Additional nutrient removal also required.	Constraints - feasibility
37.14	Water recycling - Bournemouth - SWW II	Option rejected. Holdenhurst provide majority of lower Stour flows in dry periods, so effluent diversion would result in WFD status deterioration Complex pipe routing with river and A-road crossings. Additional nutrient removal also required.	Constraints - feasibility
37.15	Water recycling - Bristol Water I	Option rejected. Bristol reservoir used for fishing, so not promotable to customers. Additional treatment at Bristol WTW required, as well as reverse osmosis to combat salinity issues.	Environmental impact - water body
37.16	Water recycling - Bristol Water II	Option rejected. Additional treatment at Bristol WTW required, as well as reverse osmosis to combat salinity issues. Chew Valley is a designated SSSI, and used for recreation, so not promotable on environmental concerns or to customers.	Environmental impact - water body
37.17	Water recycling - Bristol Water III	Option rejected. Additional treatment at Bristol WTW required for salinity issues, and Quarry not being considered as a new reservoir yet.	Uncertainty - dependencies
37.18	Water recycling - Mendip Reservoir	Option rejected. Additional treatment at Bristol WTW required and refill of Mendips Quarry preferred from natural water body.	Uncertainty - dependencies
37.19	Water recycling- Bournemouth SWW III	Option rejected. Similar outcome gained from Poole to Longham option that uses the river as conveyor as it maintains river levels, and also uses less operational carbon and requires less infrastructure. Engineering challenges with complex pipework route (large A-road and river crossings). STW near Poole is constrained and would likely need existing units upgraded or removed before new processes added.	Alternative options with lower impact

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
37.21	Water recycling - Bristol Water IV	Option rejected. Chew valley is a SSSI. Impact to WQ of lake quite likely, and customer promotability to this option much lower than other re-use options due to recreational use of the site	Environmental impact - water body
37.22	Water recycling - Bristol Water V	Option rejected. Quarry not a developed reservoir, which is a big constraint to the option. Saltford also has salinity issues, and catchment trade influences, so would need reverse osmosis treatment.	Uncertainty - dependencies
37.23	Water recycling - Bristol Water VI	Option rejected. Bristol Reservoir used for sailing, so there would be a social impact. Low promotability, environmental impact from additional treatment (reverse osmosis). Catchment of trade and hospital waste.	Uncertainty - water quality
37.24	Water recycling - Bristol Water VII	Option rejected. Bristol Reservoir used for fishing, so a social impact will be logged. Low promotability, environmental impact from addition treatment (reverse osmosis). Catchment of trade and hospital waste.	Environmental impact - water body
37.25	Water recycling - Bristol Water VIII	Option rejected. Low promotability, environmental impact from addition treatment (reverse osmosis). Long transmission to site. Catchment of trade and hospital waste. Quarry not yet developed, so option is dependent upon that.	Uncertainty - dependencies
37.26	Water recycling – Yeovil Reservoir I	Option rejected. Transmission routing through AONB, not very promotable to customers. Additional treatment required and change in taste of water from WTW near Yeovil. Impact upon raw water quality. Reservoir near Yeovil has very flashy catchment, refills quickly when it does rain. Also moving water away from area of deficit.	Uncertainty - water quality
37.27	Water recycling – Yeovil Reservoir II	Option removed from Stantec report due to available resource from STW in Yeovil. Although lower yield is offset by lower environmental impact on routing of resource to reservoir near Yeovil when compared to Weymouth option, STW in Yeovil is too small.	Environmental impact - water body

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
38.02	Under-utilised licence - Blandford Forum Source	Option rejected. Recent improvements in 2021-22 have increased reliable site output to 10Ml/d, so additional work on site not cost effective compared to other production site specific options.	Uncertainty - cost
38.03	Under-utilised licence - Mid Dorset	Option rejected. Confirmed that the new licence at WTW in Mid-Dorset will be implemented when stream support is on, so less benefit in a peak period. Spend to save scheme at this WTW before 2025 to improve treatment, utilising site output to new licence limit.	Uncertainty - yield
38.05	Underutilised licence - Mid Stour I	Option rejected, as Environmental Destination likely to reduce Mid Stour I source availability in peak demands in the future, as well as be subject to WFD no deterioration assessments. Option to improve connected WTW output could incorporate additional improvements at Mid Stour I source too.	Uncertainty - yield
38.07	Under-utilised Licence - South East Dorset	Option rejected due to its low yield gain. Recent improvements on site have increased output to 0.75Ml/d	Uncertainty - yield
38.08	Under-utilised Licence - North Salisbury	Option rejected as confirmed that reductions will occur following WINEP investigations this AMP. Upsized pump in current borehole to 1.5Ml/d, which is above max available licence following WINEP reductions.	Uncertainty - yield
38.09	Under-utilised Licence - Weymouth	Standalone option rejected, instead being combined with Upwey network reconfigurations. This will reduce dependencies within the WRMP between different options.	Option combined upon review
38.1	Under-utilised Licence - North Warminster II	Option rejected. Relatively small yield gain likely and uncertainty around future use of source.	Uncertainty - yield
40.01	Use of existing private water supplies (including Industrial and MoD)	Option rejected. MoD sites require licencing soon and are subject to the same WFD and Environmental Destination restrictions as us. No summer water available to utilise	Uncertainty - yield
41.02	Drought Permit - Tadnoll catchment	Option rejected from WRMP	Option combined upon review

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
41.03	Drought Permit - Tone catchment	Option rejected from WRMP	Option combined upon review
41.04	Drought Permit - Yeo catchment	Option rejected from WRMP	Option combined upon review
41.05	Drought Permit - Piddle catchment	Option rejected from WRMP	Option combined upon review
42.01	Reservoir sedimentation - removal via dredging	Option rejected. Social impacts at reservoirs used for recreation/fishing. Impacts upon reservoir habitat. Large cost in relation to volume gained. Waste material likely to be classed as toxic	Uncertainty - yield
42.02	Reservoir sedimentation - minimising sedimentation via silt traps, catchment management	Option rejected. Possible nature-based solution by managing catchments more to reduce rapid run-off/capture more sediment. Silt traps in streams/rivers could also be used, low tech and not carbon intensive	Uncertainty - yield
5.09	Water saving business visits - level 2	Option rejected. Collaboration with water retailers and large businesses to improve awareness of water usage. Similar to 5.06 and 5.10 but only 5.10 has progressed due to it having the greatest yield benefit.	Standalone option - combined into scenario
5.1	Water saving business visits - level 3	Collaboration with water retailers and large businesses to improve awareness of water usage. Similar to 5.06 and 5.09 but this is the progressed option due to the greatest yield benefit.	Standalone option - combined into scenario
6.02	Home Check - Level 2	Option rejected. Low impact on environment, should lead to a benefit from reduced water usage. Flexible and scalable, but demand reduction is likely to be greater if a meter is installed as well. Could target Hampshire Avon locations as part of a smart metering trial. Similar to 6.01 and 6.03 but only 6.03 has progressed due to it having the greatest yield benefit.	Standalone option - combined into scenario
6.03	Home Check - Level 3	Low impact on environment, should lead to a benefit from reduced water usage. Flexible and scalable, but demand reduction is likely to be greater if a meter is installed as well. Could target Hampshire Avon locations as part of a smart metering trial. Similar to 6.01 and 6.02 but this option has progressed due to its greatest yield benefit.	Standalone option - combined into scenario

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
21.09	Somerset Spine main to Purbeck	Option rejected. Initially created as a combination of options but returned back to individual modular options that can be linked together, to avoid costing/carbon/environmental assessment duplications.	Option combined upon review
18.25	Somerset Spine Main to Grid	Option rejected. Initially created as a combination of options but returned back to individual modular options that can be linked together, to avoid costing/carbon/environmental assessment duplications.	Option combined upon review
22.02	Yeovil Reservoir to Grid	Option rejected. Initially created as combination of options, but then rejected to avoid double counting of environmental and carbon assessments. Option 18.02 (CALM reversal) is a similar option, which can then be linked to different sources of water.	Option combined upon review
1.09	Smarter Metering - Compulsory AMR Metering	Option rejected as standalone, instead customer side management option portfolios have been considered to include a range of metering and water efficiency scenarios	Standalone option - combined into scenario
1.1	Smarter Metering - Compulsory AMI Metering	Option rejected as standalone, instead customer side management option portfolios have been considered to include a range of metering and water efficiency scenarios	Standalone option - combined into scenario
14.03	Smarter Leakage Monitoring - New and Improved Control Zones	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
14.04	Smarter Leakage Monitoring - Logger Upgrade	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
14.05	Smarter Leakage Monitoring - Flow Meter Upgrade	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
14.06	Smarter Leakage Monitoring - More Loggers and Intelligent Analysis Software	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
14.07	Smarter Leakage Monitoring - Permanent Acoustic Loggers	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario

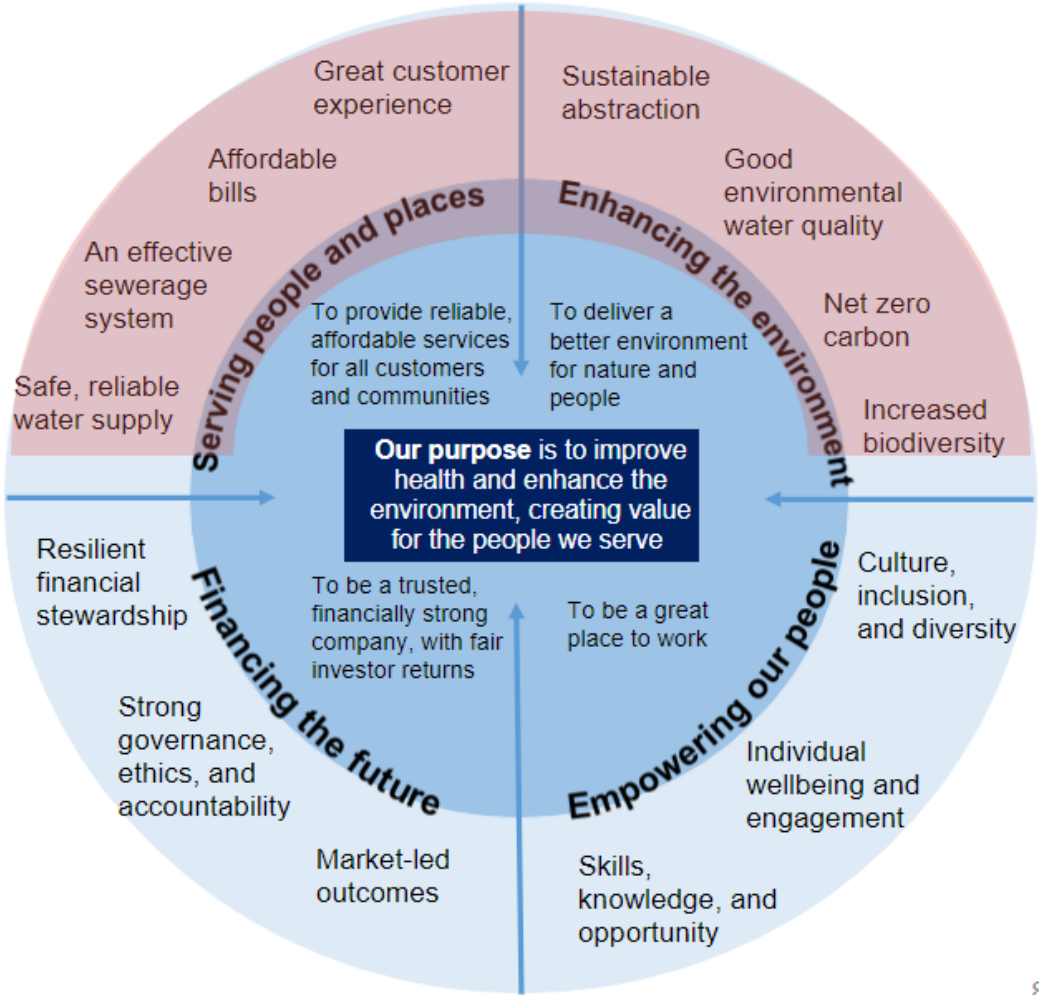
Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
12.02	Active Leakage Control - Standard ALC	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
12.03	Active Leakage Control - Lift and Shift	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
12.04	Active Leakage Control - Enhanced/Intensive ALC	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
15.03	Pressure Management - Advanced Pressure Management	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
15.04	Pressure Management - CALM Network	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
17.03	Leakage Technology - ALC Repairs Future Tech	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
17.04	Leakage Technology - Asset Renewal Future Tech	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
14.08	Customer Repair Policy - No excessive CSP repair cost limit	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
16.02	Trunk Mains Management - Flow Monitoring Zones	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
16.03	Trunk Mains Management - Trunk Mains Loggers	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
16.04	Trunk Mains Management - TM Asset Renewal	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
16.05	Trunk Mains Management - TM ALC Effort Uplift	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
13.03	Mains Replacement - Asset Renewal Mains Only	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario

Sub Option No.	Option name	Reasons for Rejection	Reasons for Rejection
13.04	Mains Replacement - Asset Renewal Mains and Comms	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
13.05	Mains Replacement - Asset Renewal Mains, Comms and CSP	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
17.05	Leak Free Mains	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
17.06	Leak Free Mains with Comms Renewal	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
17.07	Leak Free Mains with Comms and CSP Renewal	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
13.06	Service Reservoir Overflow Prevention	Options rejected as standalone, instead combined into SoLOW leakage scenarios to be considered.	Standalone option - combined into scenario
43.07	Leakage scenario: maintain current levels	Option rejected.	Baseline action
32.15a	Upper Stour New Reservoir - Stour Transfer	Option dependent upon Upper Stour new reservoir being developed. Less energy required for raw water option only (less treatment).	Constraints - feasibility
32.15b	Upper Stour New Reservoir - Stour Transfer	Option dependent upon Upper Stour new reservoir being developed	Constraints - feasibility
37.28	Water recycling and expansion: Bridgwater reservoir	Considered alongside water recycling scheme without reservoir expansion. Reservoir expansion would increase embedded carbon of this option, but also increase annual average yield	Environmental impact - land
37.29	Water recycling and expansion: Bridgwater reservoir II	Considered alongside water recycling scheme without reservoir expansion, Reservoir expansion would increase embedded carbon of this option, but also increase annual average yield	Environmental impact - land

Annex D. Wessex Water draft PR24 outcomes

Figure E-1 below displays the draft PR24 outcomes for Wessex Water, highlighted in the red half of the diagram. Excluding the 'Effective Sewerage System' outcome, all other aspects are relevant to our WRMP.

Figure E-1: Wessex Water draft PR24 outcomes



These Wessex outcomes are comparable to the EA assessment requirements for all feasible options. Table E-1 displays the alignment of Wessex PR24 outcomes, our WRMP24 fine screening criteria and the EA requirements for feasible options assessment. The focus of both the Wessex outcomes and EA assessments are environmental impacts, carbon usage, biodiversity, cost and customer acceptability.

Table E-1: Alignment of draft Wessex PR24 outcomes, WRMP fine screening criteria and EA assessment requirements

Wessex PR24	Fine screening criteria	EA requirement
Affordable bills	Cost	Y
Safe, reliable water supply	Yield	Y
	Lead time	Y
	Risks & uncertainties	Y
	Flexibility	Y
	Water Quality (DWSP)	Y
	Dependencies	Y
Great customer experience	Promotability	Y
	Socio-economic impacts	Y
	National or sector policy	N
	Difference from baseline	Y
Good environmental WQ	Area/location of options	Y
	Other option constraints	Y
Sustainable abstraction	Environmental impact (SEA, HRA, WFD)	Y
	Natural capital	Y
Increased biodiversity	Biodiversity / INNS	Y
Net zero carbon	Greenhouse gas emissions	Y
	Operation description and carbon costs	Y

Table E-2 displays how our WRMP24 coarse and fine screening criteria assessments link to our draft Wessex PR24 outcomes. As described earlier, the coarse screening is less detailed than the fine screening criteria, which is why cost is not accounted for at that stage.

Table E-2: Alignment of draft Wessex PR24 outcomes with WRMP24 coarse and fine screening criteria

Wessex outcomes		Coarse Screening			Fine Screening	
Outcome	**Outputs**	**Category**	**Coarse Criteria**	**Criteria question (yes/no)**	**Fine Criteria**	**Scoring statement (1 = no risk/impact, 5 = high risk/big impact)**
Serving people and places *To provide reliable, affordable services for all customers and communities*	**Affordable bills**	**Cost**	**n/a**		**Cost (and uncertainty)**	Is the cost of the option too high? Will this cost be passed on to customers? Is there a risk of uncertainty around the cost?
	Safe, reliable water supply	**Yield and Resilience**	**Yield**	Is this option likely to provide an increase in supply or decrease in demand?	**Yield**	Is there is a risk the option will not contribute a significant reduction in demand or increase in supply, in the right areas?
					Lead time	Is there is a risk the lead time for this option is outside of the desired planning programme to meet supply-demand deficit? (Smaller schemes in the near future, larger schemes later on)
			Resilience	Will this option increase resilience, and is it flexible for future supply-demand balance changes?	**Risks and uncertainties**	Is there a significant risk that customers wont engage with the idea? Is there a risk that demand won't be reduced? Is there a risk of losing this additional resource in future Environmental Destination determinations? Is climate change likely to restrict yield?
					Flexibility	Is the option flexible? Will it be useful in numerous different future scenarios? Can it be scaled up easily? Is it adaptable?
					DWSP / WQ	Is the option likely to pose a risk to drinking water quality or the deterioration of raw water quality?
					Dependencies & operational features	Is this option dependent on other options being developed or external factors? Is there a risk associated to this?
	Great customer experience	**Promotability**	**Promotable**	Is this option likely to be promotable to customers and CCG's?	**Promotability**	How promotable is the option to customers? Would CCGs have any reservations/pushback on the option? Does it impact WQ hardness or is the source controversial?
					Socio-economic impacts	Is there a risk of harming customers from specific economic backgrounds more than others?
		Feasiblilty	**Feasible - technically and operationally**	Would this option use technology and engineering techniques that are reliable and well known?	**National or sector policy**	Is there a risk this option will differ from accepted sector policy or national strategies?
					Difference from baseline	How does this option differ from out baseline activities? Would we do this as part of business as usual planning anyway?
Enhancing the environment *To deliver a better environment for nature and people*	**Good environmental water quality**	**Feasibility**	**Feasible - hydrology and WQ**	Is this option hydrologically feasible, and unlikely to cause any future damage to raw water quality?	**Area / location of options**	Are there likely to be any issues relating to the area/location of proposed option? Land use changes, heritage sites, designated sites etc
		Environment	**Location of option**	Is this option unlikely to cause significant impacts upon a landscape or areas used for recreation?	**Other option specific constraints**	Are there any other constraints to this option?
	Increased biodiversity		**Biodiversity Net Gain / INNS**	Could this option provide a net gain to biodiversity and not increase INNS proliferation?	**Biodiversity net gain / INNS**	Does this option pose a risk to biodiversity net gain? Is there the chance of itwill impact the environment and create new pathways for INNS proliferation?
	Sustainable abstraction		**Natural capital**	Is this option unlikely to have a significant impact upon the natural environment, reducing the availability of ecosystem services?	**Natural capital**	Is there a risk that this option will affect natural capital by: *Decreasing biodiversity *Impacting the climate *Disrupting natural hazard management *Causing deterioration of natural water purification *Causing changes to natural water regulation
	Net zero carbon		**Regulatory considerations - SEA / HRA / RBMP / WFD**	Is this option unlikely to conflict with SEA/HRA/WFD regulations?	**Environmental impact - SEA, HRA, RBMP, WFD**	Is there a chance that the option will contravene environmental regulations? SEA / HRA / INNS / WFD / RBMP
					Greenhouse gas emissions	Is there a risk this option will lead to increased greenhouse gas emissions?
					Operation description and carbon costs	Description of how the options will be utilised, and the impact on operating costs and carbon costs

Annex E. Regulatory checklist

The table below shows how we have complied with guidance and requirements as noted in the EA (Feb 2021) Water Resources Planning Guideline, in order to produce our Unconstrained Options list.

Regulator	Guidance / requirement	Wessex Actions
Environment Agency WRPG – p13	Your plan should assess options at following three scales: • National Framework • Regional Planning • Local Planning	Our unconstrained list includes options for supply increases and transfers at a national and regional scale (through consultations and workshops), as well as new sources and improvements within our own supply divisions. Demand side options were also added, at varying geographical scales within our supply boundary.
Environment Agency WRPG – p72	Your unconstrained options list should include: • Options from previous planning / WRMPs • New options identified since the last WRMP • Both supply side and demand side • Options that remove any constraints in the network • Options explored by regional groups and neighbouring water companies • Consideration for options from third party suppliers	Our unconstrained options list was developed through the following steps: • Previous Wessex WRMP options reviews, and updating where necessary • Options workshops hosted with Operations, Environmental and Engineering colleagues • Consultation with regional groups (WWRG) and neighbouring water companies • Advertising on our website, and Wessex marketplace website, for third party bids
Environment Agency WRGP – p73	You should actively engage with third parties who could provide options to you at a lower cost or provide additional benefits than your own options. The information that you publish on your website to meet Ofwat's water resources market information requirements will aid third parties in developing bids by making data more accessible. Your screening criteria for third party options should	Our water resources position statement on our website will be updated to highlight a future deficit, pending discussions and consultations with the Environment Agency. Here we will provide third parties with more information on the supply-demand challenges we face and direct them to the Wessex marketplace website for more information on how to propose bids, as per our assessment framework.

Annex F. Reference List

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