



WRSE Draft Regional Plan

Strategic Environmental Assessment Environmental Report

Appendix I - WFD Report

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	23/09/22	G Sale	M Durrant	J Fookes	Draft issue for comment
B	21/10/22	G Sale	D Gomez Jorquera	M Durrant	Issue for consultation

Document reference:

Information class: Standard

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.

Contents

1	Introduction	4
1.1	Overview	4
1.2	Guidance	4
1.3	The WFD process	5
2	Methodology	7
2.1	Approach to WFD assessments for WRSE	7
2.2	In-combination effects assessment	9
3	WFD findings	11
4	In-combination effects assessment	12
4.1	Best Value Plan options selected pre 2050	12
4.2	Best Value Plan options selected post 2050	27
5	Next Steps	33
Table 2.1: Impact scoring system from the WFD assessments		7
Table 4.1: Water bodies where in-combination effects will not lead to a risk of WFD deterioration		12
Table 4.2: Water bodies where in-combination effects will not lead to an increase in the risk of WFD deterioration over that assessed for an individual option		19
Table 4.3: Water bodies where in-combination effects from Best Value Plan options may lead to an increased risk of WFD deterioration		22
Table 4.4: Potential combined effects from post 2050 options only		27
Table 4.5: Water bodies where in-combination effects from pre and post 2050 Best Value Plan options are not anticipated to lead to a risk of WFD deterioration		28
Table 4.6: Water bodies where in-combination effects from pre and post 2050 Best Value Plan options are not anticipated to lead to a risk of WFD deterioration		30

1 Introduction

1.1 Overview

This Appendix presents the findings of the Water Framework Directive (WFD) assessment that has been undertaken as part of the environmental assessment process to support the development of the Water Resources South East (WRSE) Draft Regional Plan.

Water Resources South East (WRSE) is made up of an alliance of the six water companies that cover the South East region of England, these are:

- Affinity Water
- Portsmouth Water
- SES Water (Sutton & East Surrey)
- Southern Water
- South East Water
- Thames Water

WRSE's aim is to secure the water supply for future generations through a collaborative, regional approach to managing water resources. To meet this aim WRSE is developing a multi-sector, regional resilience plan in order to secure reliable and resilient water supplies for the south east of England. The WRSE regional plan takes a long-term view to 2100 and provides a consistent framework for the development of the member water companies Water Resources Management Plans (WRMP) 2024. Further information on the description and context for the WRSE Regional plan can be found in Chapter 2 of the WRSE Draft Regional Plan Strategic Environmental Assessment (SEA) Environmental Report.

This appendix represents the Water Framework Directive environmental assessments completed for the support of the WRSE Draft Regional Plan SEA Environmental Report. The appendix presents the findings of WFD assessments for the WRSE proposed options. The report should be read in conjunction with the individual water companies WRMP24 WFD Reports.

1.2 Guidance

The Water Framework Directive (WFD) was introduced into law for England and Wales in 2003 and was updated in 2017 (The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017) under which there is the obligation to meet targets for the ecological and chemical status of waterbodies.

The WFD's key objectives are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water. All objectives are integrated for each river basin, and the last three to specific bodies of water that are designated for drinking water abstraction, those supporting special wetlands, and bathing areas. Ecological protection should apply to all waters.

The environmental objectives of the WFD are the core of this UK legislation providing for long-term sustainable water management on the basis of a high level of protection of the aquatic environment. Within the directive Part 5 Regulation 13 sets out the “environmental objectives” for natural surface and groundwater bodies, artificial, and heavily modified water bodies (HMWBs). Natural surface water bodies must, by 2015, adhere to good ecological and chemical status and groundwater bodies to good quantitative and chemical status. Artificial and HMWBs must achieve good ecological potential and good chemical status. Regulation 13 also sets out the principle of no deterioration, providing protection from the deterioration of water status/potential. In Regulation 15 the criteria for the designation of artificial or heavily modified water bodies are described.

Exemptions are defined within Regulations 16 to 19, outlining the conditions under which the achievement of good status or potential may be phased or not be achieved, or under which deterioration may be allowed. Regulation 16 to 19 describe these distinct conditions. In summary:

- Regulation 16 allows an extension of the time limit so that good status or potential is, under certain conditions, achieved only after 2015;
- Regulation 17 allows the achievement of less stringent objectives under certain conditions;
- Regulation 18 allows the temporary deterioration of status in case of natural causes or "force majeure";
- Regulation 19 allows for deterioration of status or non-achievement of good status or potential under certain distinct conditions.

1.3 The WFD process

The WFD requires all waterbodies (both surface and groundwater) to achieve ‘good status’. The Directive also requires that waterbodies experience no deterioration in status. Good status is a function of good ecological status (biological, physico-chemical and hydromorphological elements and specific pollutants) and good chemical status (Priority Substances and Priority Hazardous Substances).

As part of the assessment process, it must be demonstrated that an option will not cause the deterioration in status of any waterbodies, as measured and defined in the WFD. This assessment should include and consider any mitigation methods that would be put in place to protect a waterbody status.

The objectives of the WFD assessment are:

- To prevent deterioration between WFD status class of any element in the waterbody as set out in WFD Regulation 13
- To prevent new impediments to attaining ‘Good’ WFD status or potential for the waterbody, or any assessed element, as set out in Regulation 13. In some waterbodies it is accepted that it is currently technically infeasible or disproportionately costly to achieve Good status or potential. If this is the case then the test is applied to current agreed objectives for the waterbody.
- To ensure that the planned programme of measures in the current cycle of River Basin Management Plans (RBMP), to help attain the WFD objectives from the waterbody, are not compromised.

As well as these legally binding WFD objectives, other objectives set out in the RBMP should be reviewed to see if the options can assist in meeting the objectives:

- Does the option assist in attaining the WFD objectives for the waterbody?

- Does the option assist in attaining the objectives associated with WFD protected areas?
- Does the option reduce treatment needed to produce drinking water and look to work in partnership with others; promoting the requirements of regulation 8?

2 Methodology

2.1 Approach to WFD assessments for WRSE

The All Company Working Group (ACWG) developed a consistent framework for undertaking WFD assessments for Strategic Resource Options (SROs) to demonstrate that options would not cause deterioration in status of any WFD waterbodies. The assessment considers mitigation that would need to be put in place to protect waterbody status. The assessment also considers WFD future objectives.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact screening. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment for Level 2. Further information on WFD classification and the approach adopted can be found in ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020.

2.1.1 Level 1 – basic screening

The first stage of WFD assessment has been completed as part of the WRSE project. The assessment followed the methodology in the WRSE Regional Plan Environmental Assessment Methodology Guidance, July 2020 for all options. Level 1 assessment followed these steps:

- Identify affected waterbodies.
- Breakdown option into activities involved in construction, operation and decommissioning phases.
- Assign each activity an impact score (based on a predefined list).
- Consider any embedded mitigation measures.
- Calculate a screening score (using a 6-point scale from -2 to 3) to 'screen out' waterbodies and options with no or very minor potential impacts from further assessment. If the maximum impact score is greater than 1 (minor localised impact) then the waterbody will need to be taken forward into level 2 screening.

The scoring system used is set out in Table 2.1 below.

Table 2.1: Impact scoring system from the WFD assessments

Impact	Score	Description
Very beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody.
Beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements.
No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.

Impact	Score	Description
Low	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effects on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Medium	2	Impacts that, 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 reduction in WFD status. Impacts have the potential to prevent target WFD objectives from being achieved.
High	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status. Potential for high impact on preventing target WFD objectives from being achieved.

A summary of the outcomes from this Level 1 assessment for all the WRSE options was provided in the WRSE Emerging Plan WFD Report, included as Appendix I of WRSE Emerging Regional Plan Strategic Environmental Assessment Environmental Report. Where waterbodies and option impacts were 'screened in', they will need to be taken forward to Level 2 assessment (as described below in Section 2.1.2).

2.1.2 Level 2 – detailed impact screening

The Level 2 assessment would follow these steps:

- Waterbody scale detailed assessment of impacts to each WFD quality element for each activity proposed as part of an option.
- Assessment of data confidence level and design certainty – confidence levels are assigned for each assessment, based on the quality and availability of both physical data and design information about the option at the time of assessment. Where the confidence levels are medium or low, the requirements for further data or design information to raise this confidence level for future Gates would be listed.
- Identification of further mitigation needs;
- Assessment of impacts after mitigation (scoring on a 6-point scale).
- Identification of activities to improve certainty of assessment outcomes.

The Level 2 WFD assessments are currently being undertaken to feed into the development of the individual water companies Water Resource Management Plans (WRMP), where these results were available they have been used in this assessment.

2.1.3 Limitations and assumptions

Many of the options considered under WRSE are still in the early stages of design development and therefore a precautionary approach has been exercised because of residual uncertainty. The WFD Level 1 assessments have the following limitations and assumptions:

- The ACWG approach uses WFD 2015 data, as it is the current officially reported baseline in the 2015-2021 Cycle 2 RBMP. The RBMPs are anticipated to be updated at the end of 2022. The 2019 WFD baseline data released in late 2020 and will become the new legal baseline once the RBMP is published. To make sure of consistency, the 2015 data has been used for this assessment, but acknowledges that this will need to be updated to the 2019 status as soon as the RBMPs are published.
- The assessment assumes pipelines are underground (directionally drilled or pipe-jacked beneath any water courses) and therefore will not cross watercourses above ground or cause direct impacts.
- For canal transfer options, the assessment does not currently include structural changes to canals where these are used, although some modifications would likely be necessary. Modifications to canals would be unlikely to pose risk of deterioration to WFD status given their artificial nature but would need to consider future objectives and environmentally sensitive designs/mitigation to be integrated when design information becomes available.
- For effluent reuse options, it is assumed that the current discharge water quality would fail to meet Good status for at least some of the WFD water quality parameters in receiving waterbodies. At this stage the WFD risk assessment does not take into account additional treatment and retains a risk of changes to physico-chemical conditions until further evidence is provided by treatment process design and water quality dispersion modelling.
- Assessment assumes fail safes / stop of transfer will be in place in the case of a significant failure of treatment.
- The geographical extent of the WFD assessment is generally limited to water bodies between the start point and end point of the option. There is potential for some effects continuing downstream of the abstraction point, although it is assumed these would become increasingly limited to 'negligible' with distance. A high level review is carried out on a case-by-case basis to identify where downstream impacts are possible and then these waterbodies have been included in the relevant assessments. This assumption will need to be reviewed as additional hydrological studies are undertaken.
- Transfer operational requirements are unknown at this stage and the assessment has not accounted for seasonality or sweetening flows (e.g. with respect to flows in watercourses).

2.2 In-combination effects assessment

This technical appendix only reports on the WFD in-combination effects assessment of the chosen programmes of options selected in the Draft Regional Plan (referred to as the Best Value Plan) and under Situation 4 (see SEA Environmental Report, Section 2.3 for an explanation of the BVP development and the use of a situation tree for adaptive planning):

- Draft Regional Plan (Best Value Plan) – Investment model pareto runs for Best Value Plan metrics (Customer Preference, SEA+, SEA-, Natural Capital, Carbon, Resilience (reliability, adaptability, evolvability), intergenerational equity), this is optimised on both individual Best Value Plan and cost metrics

The approach has involved two separate assessments which has comprised of options selected by 2050 (as presented in Section 4.1), and separately those selected post 2050 (and up until 2075) (see Section 4.2). The pre and post 2050 options have been assessed separately because up to 2050 is the 25-year statutory WRMP period and after this the plan becomes the regional strategy with uncertainty related to planning scenarios and technical improvements for options. The two alternative programmes, the

Least Cost Plan and the Best Environmental and Societal Plan, have not been subject to the WFD in-combination assessment.

This assessment aims to assess any additional risk of deterioration in WFD status caused by activities from multiple options taking place within them.

As part of the individual WRMP produced for each water company that forms WRSE's regional group, in-combination effects assessment (in some companies presented as intra-plan effects) for WFD have been carried out on selected WRMP plans. These assessments identify any potential additional risk of deterioration to WFD from multiple WRMP options for that water company. Therefore, for WRSE the in-combination effects assessment focuses on potential for in-combination effects for Best Value Plan options across water companies.

The in-combination effects assessment has been carried out using either the Level 1 or Level 2 WFD assessments, depending on what was available at the time of reporting. Level 1 and 2 assessments were available for Affinity Water, Thames Water and some South East Water WRMP options. Only Level 1 assessments were available for Portsmouth Water, SES Water, Southern Water and some South East Water options.

An initial screening exercise has been carried out to identify any waterbodies where more than one Best Value Plan option from different water companies are present. An assessment has then been carried out to understand the potential combined impact caused by options from different water companies, within these water bodies.

The in-combination assessment identifies and assesses any risk of deterioration from all option activities occurring within the water body. This helps to determine if the impact of the proposed activities associated with all options could lead to an increased risk of WFD deterioration, and as such may require further mitigation.

3 WFD findings

A Level 1 WFD assessment was undertaken for each option included within the investment model. Options which required further WFD assessment to adequately assess potential significant effects in waterbodies have had Level 2 WFD assessments undertaken, through each individual water company WRMP.

Over 1,000 options were screened in and assessed as part of this process and this technical appendix does not present the individual assessment matrices for each of the options which have been considered as part of the Draft Regional Plan. The assessment sheets for individual options are available on request from water companies through WRSE.

This technical appendix only reports on the in-combination effects assessment for the Best Value Plan options with potential inter-company effects.

4 In-combination effects assessment

4.1 Best Value Plan options selected pre 2050

4.1.1 No risk of WFD deterioration from multiple options

Table 4.1 presents a list of water bodies which are impacted by more than one of the Best Value Plan options across different water company boundaries. The in-combination effects assessment has shown that for the following water bodies, in-combination Best Value Plan option activities are not anticipated to lead to a risk of WFD deterioration.

The in-combination effects assessment has been carried out using either the Level 1 or Level 2 WFD assessments, depending on what was available at the time of reporting. Level 1 and 2 assessments were available for Affinity Water, Thames Water and some South East Water WRMP options. Only Level 1 assessments were available for Portsmouth Water, SES Water, Southern Water and some South East Water options.

Table 4.1: Water bodies where in-combination effects will not lead to a risk of WFD deterioration

Waterbody impacted	Water companies	Option(s)	Comment
GB107040019640: East Stour	Affinity and South East Water	<ul style="list-style-type: none"> Affinity Water: Aldington to Saltwood Increase by 6MI/d South East Water: New Bulk Supply: SWS to RZ8 - Brede to Kingsnorth (10MI/d) 	<p>The Aldington to Saltwood Increase by 6MI/d option intersects the Affinity and South East Water boundary in the East Stour waterbody. Activities associated with the new option include the installation of new pipelines and associated below ground structures due to new crossings. The New Bulk Supply: SWS to RZ8 – Brede to Kingsnorth (10MI/d) transfer option also occurs within this waterbody but outside of the 500m corridor. This option involves the installation of new pipeline within this waterbody. No in-combination effects are anticipated, therefore, no additional risk of WFD deterioration has been identified, even if the options are constructed simultaneously.</p> <p>Therefore, risk to this waterbody remains as minor localised effect.</p>

Waterbody impacted	Water companies	Option(s)	Comment
GB107040019590: Nailbourne and Little Stour	Affinity and Southern Water	<ul style="list-style-type: none"> Affinity Water: Barham Import Increase (of 4Ml/d) to 6Ml/d Southern Water: Import - SEW Kingston to KTZ Near Canterbury (2Ml/d) Southern Water: Canterbury (Broad Oak) to Near Canterbury: 20Ml/d 	<p>The Barham Import Increase (of 4Ml/d) to 6Ml/d option intersects the Affinity and Southern Water boundary in the Nailbourne and Little Stour waterbody. Activities associated with this option include the installation of new pipelines and below ground structures associated with new mains connection. Import: SEW Kingston to KTZ Near Canterbury (2Ml/d) and Canterbury (Broad Oak) to Near Canterbury: 20Ml/d options are also active within this waterbody with new pipelines and below ground structures. In combination, these options are not anticipated to lead to an increased risk of WFD deterioration, due to the relative minor works and distance between the options. Therefore, risk to waterbody remains as minor localised effect.</p>
GB107040019570: Wingham to Little Stour	Affinity and Southern Water	<ul style="list-style-type: none"> Affinity Water: Barham Import Increase (of 4Ml/d) to 6Ml/d Southern Water: Import - SEW Kingston to KTZ Near Canterbury (2Ml/d) Southern Water: Canterbury (Broad Oak) to Near Canterbury: 20Ml/d 	<p>The Barham Import Increase (of 4Ml/d) to 6Ml/d option intersects the Affinity and Southern Water boundary in the Wingham to Little Stour waterbody. Activities associated with this option include the installation of new pipelines and below ground structures associated with new mains connection. Import: SEW Kingston to KTZ Near Canterbury (2Ml/d) and Canterbury (Broad Oak) to Near Canterbury: 20Ml/d options are also active within this waterbody with new pipelines and below ground structures. Preston Marshes (SSSI) is also located in this water body but the options will not lead to an adverse impact on the designated site.</p> <p>In combination, these options are not anticipated to lead to an increased risk of WFD deterioration, due to the relative minor works and distance between the options. Therefore, risk to waterbody remains as minor localised effect.</p>

Waterbody impacted	Water companies	Option(s)	Comment
GB40702G501600: East Kent Tertiaries	South East and Southern Water	<ul style="list-style-type: none"> Southern Water: Canterbury (Broad Oak) to Near Canterbury: 20MI/d South East Water: RZ8 Zonal Scheme - [DES-15] - Transfer of water from Ford water treatment works (WTW) 	Canterbury (Broad Oak) to Near Canterbury: 20MI/d option intersects with the 500m boundary corridor in the East Kent Tertiaries waterbody. Another Best Value Plan option within this waterbody is the RZ8 Zonal Scheme - [DES-15] - Transfer of water from Ford WTW option. Both option activities include below ground structures, installation of new pipelines and crossings. It is not anticipated that in-combination effect will lead to an increased risk of WFD deterioration, due to the distance between the two options and the relatively minor works taking place. Therefore, risk to the waterbody remains as minor localised effect .
GB640704540003: Sussex (Coastal WB)	Portsmouth and Southern Water South East Water and Southern Water	<ul style="list-style-type: none"> Portsmouth Water: SRN Source D To Havant Thicket: 50MI/d Southern Water: Havant Thicket To Pulborough WTW: 50MI/d Southern Water: Recycling - Littlehampton waste water treatment works (WwTW) (15MI/d) Southern Water: Drought option - North Arundel Drought Permit/Order (2025 onwards) South East Water: Peacehaven Recycling at Arlington (30MI/d Option) Southern Water: Worthing to Brighton: 40MI/d Southern Water: Desalination - Sussex 	<p>The four options from the Portsmouth and Southern Water boundary are located at the western extent of this waterbody. The four options are located in the eastern extent of this waterbody. Given the geographical extent of the waterbody, it is not anticipated that any in-combination effects will occur between the Portsmouth and Southern Water boundary options and the South East and Southern Water boundary options. Therefore, the two sets of boundary options are considered separately below.</p> <p>SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d options both cross the 500m boundary within Sussex coastal waterbody. These options use the same stretch of new pipeline (in opposite directions) and associated crossings so impacts are assumed to be the same for both options. Recycling: Littlehampton WwTW (15MI/d) option also crosses the 500m boundary and involves a new WTW discharge, new pipelines and crossings. Drought option: North Arundel Drought Permit/Order (2025 onwards) option is assumed to only</p>

Waterbody impacted	Water companies	Option(s)	Comment
		Coast (Modular 0-10MI/d) (10MI/d) <ul style="list-style-type: none"> Southern Water: Transfer - Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A (4MI/d) 	<p>impact the underlying groundwater body.</p> <p>The in-combination effect of these options is not anticipated to lead to no additional risk of WFD deterioration especially as construction dates do not overlap (operational impact also assumed minimal). Therefore, risk to the waterbody remains as minor localised effect.</p> <p>Both Peacehaven Recycling at Arlington (30MI/d Option) and Worthing to Brighton: 40MI/d options intersect 500m boundary corridor at different locations within Sussex coastal waterbody. Other options within this waterbody include Desalination: Sussex Coast (Modular 0-10MI/d) (10MI/d) and Transfer: Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A (4MI/d) options. Activities associated with these four options include below ground structures, new pipelines and a new WTW discharge. In combination effects of all these options is not anticipated to lead to an increased risk of WFD deterioration. Therefore, risk to the waterbody remains as minor localised effect.</p>
GB40701G502500: Brighton Chalk Block	South East and Southern Water	<ul style="list-style-type: none"> South East Water: Peacehaven Recycling at Arlington (30MI/d Option) Southern Water: Worthing to Brighton: 40MI/d Southern Water: Desalination - Sussex Coast (Modular 0-10MI/d) (10MI/d) Southern Water: Transfer - Winter transfer Stage 2: New main Shoreham/North 	<p>Both Peacehaven Recycling at Arlington (30MI/d Option) and Worthing to Brighton: 40MI/d options intersect 500m boundary corridor at different locations within Brighton Chalk Block waterbody. Other options within this waterbody include Desalination: Sussex Coast (Modular 0-10MI/d) (10MI/d) and Transfer: Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A (4MI/d) options. Activities associated with these four options include below ground structures, new pipelines and a new WTW discharge. In combination effect of all options is not anticipated to lead to an increased risk of WFD deterioration at a waterbody</p>

Waterbody impacted	Water companies	Option(s)	Comment
		Shoreham and Brighton A (4Ml/d)	scale, primarily due to the distance between the options. Therefore, risk to the waterbody remains as minor localised effect .
GB106039022850: Beverley Brook (Motspur Park to Thames) and Pyl Brook at West Barnes	Sutton and East Surrey (SES) and Thames Water	<ul style="list-style-type: none"> • Sutton and East Surrey Water: Transfer from Merton (TW) to SES Boundary at 15Ml/d • Thames Water: Thames Water ring Main (TWRM) extension - Hampton to Battersea - Construction 	Transfer from Merton (TW) to SES Boundary at 15Ml/d option intersects the 500m boundary within Beverley Brook (Motspur Park to Thames) and Pyl Brook at West Barnes water body. TWRM extension – Hampton to Battersea – Construction option also interacts with this waterbody (outside of boundary) with both options involving new pipelines and below ground structures within this waterbody. In combination effect of options are not anticipated to lead to any additional risk of WFD deterioration, due to the minor nature of the works. Risk to the waterbody remains as minor localised effect .
GB106039023460: Wandle (Croydon to Wandsworth) and the R. Graveney	Sutton and East Surrey (SES) and Thames Water	<ul style="list-style-type: none"> • Sutton and East Surrey Water: Transfer from Merton (TW) to SES Boundary at 15Ml/d • Thames Water: TWRM extension - Hampton to Battersea – Construction • Sutton and East Surrey Water: Hackbridge drought permit • Sutton and East Surrey Water: Kenley and Purley drought permit 	Transfer from Merton (TW) to SES Boundary at 15Ml/d option intersects the 500m boundary within Wandle (Croydon to Wandsworth) and the R. Graveney. TWRM extension – Hampton to Battersea – Construction option also interacts with this waterbody (outside of the 500m boundary) with both options involving new pipelines and below ground structures within this waterbody. Each drought permit impacts the same watercourse (Wandle Croydon to Wandsworth and the River Graveney). A cumulative impacts assessment has already been carried out within the drought permit assessment report which states 'Hydrological analysis has indicated that operation of SES Water's three drought permits (Outwood Lane, Hackbridge and Kenley & Purley) concurrently will not significantly impact surface flows in the River Wandle. It is

Waterbody impacted	Water companies	Option(s)	Comment
			therefore anticipated that the impact on other abstractors is still negligible.’ ¹ In combination effect of options are not anticipated to lead to any additional risk of WFD deterioration, due to the minor nature of the works, and the assessment provided in the drought plans. Risk to the waterbody remains as minor localised effect .
GB106039017280: Enborne (Source to downstream A34)	Thames and Southern Water	<ul style="list-style-type: none"> Thames Water: Newbury Groundwater Southern Water: Import from Portsmouth Water (additional 9Ml/d) Southern Water: Culham to HWZ(200) Potable - Construction 	All three WRSE Best Value Plan options intersect the 500m corridor boundary within Enborne (Source to downstream A34) waterbody. Activities associated with these options include the modification of an existing WTW site and associated boreholes, installation of new pipelines with associated below ground activities assumed. The Import from Portsmouth Water (additional 9Ml/d) and Culham to HWZ(200) Potable – Construction options use the same stretch of pipeline within this waterbody so in combination effect of options is not anticipated to lead to an increased risk of WFD deterioration. Therefore, it is assumed that risk to waterbody remains as minor localised effect overall.
GB40601G501800: West Kent Darent Cray Chalk	Thames and Southern Water	<ul style="list-style-type: none"> Southern Water: Desalination - River Thames estuary (20Ml/d) Thames Water: Groundwater Development - Southfleet & Greenhithe Thames Water: Manager Aquifer Recharge - Horton Kirby ASR 	The Desalination: River Thames Estuary (20Ml/d) option intersects the 500m boundary corridor in West Kent Darent Cray Chalk waterbody. Other options occurring within this waterbody are the Groundwater Development - Southfleet & Greenhithe and Manager Aquifer Recharge - Horton Kirby ASR options. Activities in this waterbody involve the installation of new pipelines, below ground structure and an increased groundwater abstraction (outside RAA rates). It is assumed that if appropriate mitigation measures are in place (as summarised in the WFD assessments)

¹ Atkins and SES Water 2021, Appendix H: Hackbridge Drought Permit Environmental Assessment Report [SES Water drought plan | SES Water](#)

Waterbody impacted	Water companies	Option(s)	Comment
			there is no anticipated increase in risk of WFD deterioration. Therefore, the risk to waterbody remains as minor localised effect .
GB40702G502200: Kent Weald Eastern - Rother	Sutton and East Sussex and Southern Water	<ul style="list-style-type: none"> South East Water: New Bulk Supply - SWS to RZ8 - Brede to Kingsnorth (10MI/d) Southern Water: Recycling - Hastings WTW conjunctive use with Darwell reservoir (15.3MI/d) 	New Bulk Supply: SWS to RZ8 - Brede to Kingsnorth (10MI/d) Best Value Plan option intersects the 500m water company boundary corridor within Kent Weald Eastern – Rother waterbody. Another Best Value Plan option, Recycling: Hastings WTW conjunctive use with Darwell reservoir (15.3MI/d) is also proposed to be constructed within this waterbody. Activities associated with both options include below ground structures, installation of new pipelines and road/watercourse crossings. In-combination effect are not anticipated to lead to an increase in WFD deterioration. Therefore, risk to waterbody remains as minor localised effect .
GB40701G505100: Sussex Lambeth Group	Portsmouth and Southern Water	<ul style="list-style-type: none"> Portsmouth Water: SRN Source D To Havant Thicket: 50MI/d Southern Water: Havant Thicket To Pulborough WTW: 50MI/d Southern Water: Recycling - Littlehampton WwTW (15MI/d) 	Recycling: Littlehampton WwTW (15MI/d) option crosses the 500m water company boundary corridor within the Sussex Lambeth Group waterbody. Both the SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d options use the same stretch of pipeline and occur within this waterbody too. Option activities involve new pipelines and road/watercourse crossings. In-combination effect is not anticipated to lead to an increased risk of WFD deterioration. Therefore, risk to this waterbody remains as minor localised effect .
GB40701G503100: Lower Greensand Arun and Western Streams	Sutton and East Surrey and Southern Water	<ul style="list-style-type: none"> Southern Water: Tilmore to Pulborough: 10MI/d Southern Water: Recycling - Littlehampton WwTW (15MI/d) 	Tilmore to Pulborough: 10MI/d option intersects the 500m water company boundary corridor within Lower Greensand Arun and Western Streams waterbody. Other Best Value Plan options within this waterbody (not within the 500m boundary corridor) are

Waterbody impacted	Water companies	Option(s)	Comment
		<ul style="list-style-type: none"> • Portsmouth Water: SRN Source D To Havant Thicket: 50MI/d • Southern Water: Havant Thicket To Pulborough WTW: 50MI/d • Southern Water: Pulborough to Worthing: 60MI/d 	Recycling: Littlehampton WwTW (15MI/d), SRN Source D To Havant Thicket: 50MI/d, Havant Thicket To Pulborough WTW: 50MI/d and Pulborough to Worthing: 60MI/d. All option activities involve below ground structures, installation of new pipelines and road/watercourse crossings within this waterbody. In-combination effect is not anticipated to lead to an increased risk of WFD deterioration at waterbody scale. Therefore, risk to this waterbody remains as minor localised effect .

Table 4.2 presents a list of water bodies which are impacted by more than one of the Best Value Plan options across different water companies, where a risk of deterioration has been identified for one or more of the individual options. The in-combination effects assessment has shown that for the following water bodies, in-combination Best Value Plan option activities are not anticipated to lead to an increase in the risk of WFD deterioration, over that identified for one of the individual options. Following further investigation, if mitigation is applied to any of these options then these in combination effects would need to re-assessed.

Table 4.2: Water bodies where in-combination effects will not lead to an increase in the risk of WFD deterioration over that assessed for an individual option

Waterbody impacted	Water companies	Options	Comment
GB530604011500: Swale	Southern and South East Water	<ul style="list-style-type: none"> • South East Water: New Company Transfer - RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) • Southern Water: Transfer - Utilise full existing KME-KTZ transfer capacity (9MI/d) • Southern Water: Desalination - Isle of Sheppey (20MI/d) • Southern Water: Recycling - Sittingbourne industrial reuse (7.5MI/d) 	Three options with activities within this waterbody are associated with Southern Water and one is associated with South East Water. Southern Water: Desalination - Isle of Sheppey (20MI/d) and Southern Water: Recycling - Sittingbourne industrial reuse (7.5MI/d) options both intersect the 500m water company boundary corridor. Option activities include the installation of new pipelines with below ground structures associated with road and watercourse crossings within this waterbody. Other specific activities include the modification of a WTW, and for Recycling - Sittingbourne industrial reuse (7.5MI/d) option, construction of below ground structures within 500m of a groundwater dependent terrestrial ecosystem (GWDTE), the refurbishment of an existing borehole and use of an

Waterbody impacted	Water companies	Options	Comment
			existing licence outside RAA rates. It is assumed that in combination, impacts from all option activities will not lead to deterioration further than what is already described in the Recycling – Sittingbourne industrial reuse (7.5Mld) option assessment. Therefore, risk to waterbody remains as amber adverse effect .
GB530604002300: Medway	Southern and South East Water	<ul style="list-style-type: none"> • South East Water: Groundwater Licence Trade - Halling • South East Water: RZ6 Zonal Scheme - [LIC-20] Complete reinforcement to Halling Reservoir • South East Water: New Company Transfer - RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) • Southern Water: Recycling - Medway WwTW (12.8MI/d) • Southern Water: Desalination - Isle of Sheppey (20MI/d) 	Three options with activities in this waterbody are associated with South East Water with two associated with Southern Water. None of the five options directly intersect the Water company boundary buffer but all have option activities associated with this waterbody. All options involve the installation of new pipelines within this waterbody while the New Company Transfer - RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) and Groundwater Licence Trade – Halling options both involve below ground structures. Other option specific activities include the Recycling - Medway WwTW (12.8MI/d) option with below ground structures within 500m of a GWDTE (Holborough to Burham Marshes SSSI), and the Groundwater Licence Trade – Halling option involves the refurbishment of an existing borehole and use of an existing groundwater licence outside RAA. It is assumed that in-combination, all option activities will not lead to an increased risk of WFD deterioration at waterbody scale outside of what is already described in the Recycling - Medway WwTW (12.8MI/d) and the Groundwater Licence Trade – Halling option assessments. Therefore, risk to this waterbody remains as amber adverse effect .

Waterbody impacted	Water companies	Options	Comment
GB40601G500300: North Kent Medway Chalk	Thames and Southern Water	<ul style="list-style-type: none"> Southern Water: Desalination - River Thames estuary (20MI/d) Thames Water: Groundwater Development - Southfleet & Greenhithe South East Water: Groundwater Licence Trade – Halling South East Water: RZ6 Zonal Scheme - [LIC-20] Complete reinforcement to Halling Reservoir South East Water: New Company Transfer - RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) 	Desalination: River Thames estuary (20MI/d) and Groundwater Development - Southfleet & Greenhithe options intersect the 500m water company boundary corridor in the North Kent Medway Chalk waterbody. Other Best Value Plan options in this waterbody are Groundwater Licence Trade - Halling, RZ6 Zonal Scheme - [LIC-20] Complete reinforcement to Halling Reservoir and New Company Transfer: RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d). Option activities in this waterbody include installation of new pipeline, below ground structures, new intake and increased groundwater abstraction licence. The in-combination effect of all Best Value Plan options is not anticipated to lead to an increased risk of WFD deterioration. Therefore, risk to waterbody will remain as amber adverse effect as per Groundwater Licence Trade -Halling WFD assessment
GB40601G602200: Epsom North Downs Chalk	Sutton and East Surrey and Thames Water	<ul style="list-style-type: none"> Sutton and East Surrey Water: Transfer from Merton (TW) to SES Boundary at 15MI/d Thames Water: Groundwater Development - Addington 	The Transfer from Merton (TW) to SES Boundary at 15MI/d Best Value Plan option crosses the 500m boundary corridor in Epsom North Downs Chalk waterbody. Another option within this waterbody is Groundwater Development - Addington (outside of 500m boundary corridor). Activities associated with these Best Value Plan options include installation of new pipelines, below ground structures and a new borehole with associated new groundwater abstraction. In-combination effect unlikely to lead to an increased risk of WFD deterioration outside of that already described in Groundwater Development – Addington’s WFD assessment . Therefore, risk to waterbody remains as major adverse effect .

Waterbody impacted	Water companies	Options	Comment
GB530603911402: Thames Middle	Thames and Southern Water	<ul style="list-style-type: none"> Southern Water: Desalination - River Thames estuary (20Ml/d) Thames Water: Groundwater Development - Southfleet & Greenhithe 	Both of these WRSE Best Value Plan options intersect the 500m water company boundary corridor in the Thames Middle transitional waterbody. Activities in this waterbody include installation of new pipeline, below ground structures, new highly saline discharge associated with new desalination plant, new intake and abstraction licence. Desalination: River Thames estuary (20Ml/d) option is anticipated to have a significant impact on the transitional waterbody, particularly within the Thames. The in-combination effect of both of these options is not anticipated to assumed to lead to an increase in WFD deterioration over that already described in the River Thames estuary desalination option , particularly as construction periods do not overlap and operational impacts are assumed minimal. Therefore, risk to waterbody will remain as major adverse effect .

4.1.2 Potential increased risk of WFD deterioration

The in-combination effects assessment has shown that for the following water bodies, in combination Best Value Plan option activities across water company boundaries which may lead to a possible increased risk of WFD deterioration. These are shown in Table 4.3 below.

Table 4.3: Water bodies where in-combination effects from Best Value Plan options may lead to an increased risk of WFD deterioration

Waterbody impacted	Water companies	Option(s)	Comment
GB40701G501500: East Kent Chalk - Stour	Affinity and Southern Water	<ul style="list-style-type: none"> Affinity Water: Barham Import Increase (of 4Ml/d) to 6Ml/d Southern Water: Import - SEW Kingston to KTZ Near Canterbury (2Ml/d) Southern Water: Canterbury (Broad 	The Barham Import Increase (of 4Ml/d) to 6Ml/d and Deal Supply Scheme options intersect the 500m boundary corridor within this waterbody. Other Best Value Plan options occurring within this waterbody are Import: SEW Kingston to KTZ Near Canterbury (2Ml/d), Canterbury (Broad Oak) to Near Canterbury: 20Ml/d and Dover Docks Reservoir - Broomfield Banks Effluent Reuse Dover Constraint Removal

Waterbody impacted	Water companies	Option(s)	Comment
		<p>Oak) to Near Canterbury: 20MI/d</p> <ul style="list-style-type: none"> ● Affinity Water: Dover Docks Reservoir - Broomfield Banks Effluent Reuse ● Affinity Water: Dover Constraint Removal ● Affinity Water: Deal Supply Scheme 	<p>options. Option activities include the construction of a new reservoir, new surface water abstraction to supply reservoir and groundwater abstractions (associated with Deal Supply Scheme and Dover Constraint Removal options), installation of new pipelines and below ground structures.</p> <p>These option activities could lead to adverse impacts on the groundwater environment. However, these options will be bought forward for construction at different times and therefore construction impacts are not expected to overlap. Dover Docks Reservoir, Barham Import Increase (of 4MI/d) to 6MI/d and Canterbury (Broad Oak) to Near Canterbury options have overlapping construction periods, with operational impacts assumed minimal for all options. The staggered construction impacts partnered with the appropriate mitigation measures (as described in WFD assessments) in place will lead to no increase in risk of WFD deterioration. This assessment has been based on Level 1 WFD assessments, as the Level 2 assessments for Southern water are not available at the time of this assessment.</p> <p>Impact on waterbody will remain as amber adverse effect as per Deal Supply scheme and Dover Constraint Removal assessment.</p>
GB530603911401: Thames Lower	South East and Southern Water	<ul style="list-style-type: none"> ● Southern Water: Desalination - Isle of Sheppey (20MI/d) ● Southern Water: Recycling - Sittingbourne industrial reuse (7.5MI/d) ● South East Water: New Company Transfer - RZ8 to RZ6 	<p>The Desalination: Isle of Sheppey (20MI/d) and Recycling: Sittingbourne industrial reuse (7.5MI/d) options both intersect the 500m boundary corridor in the Thames Lower coastal waterbody. Two other options which also take place within this waterbody (although outside of the 500m boundary corridor) are the New Company Transfer: RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) and Transfer: Utilise full existing KME-KTZ transfer capacity (9MI/d)</p>

Waterbody impacted	Water companies	Option(s)	Comment
		<ul style="list-style-type: none"> Transfer - Canterbury to Maidstone (10 MI/d) • Southern Water: Transfer - Utilise full existing KME-KTZ transfer capacity (9MI/d) 	<p>options. Activities associated with these four options include the installation of new pipelines, below ground structures, refurbishment of existing groundwater sources and modification of an existing WTW.</p> <p>There is the potential for WFD deterioration due to the combined impacts of these options. It is anticipated that the impact on the waterbody will not exceed that already described in the Recycling: Sittingbourne industrial reuse (7.5Mld) option assessment. This is due in part to the minor and localised impacts associated with the other three options and the difference in construction periods leading to an assumed reduced cumulative impact. Therefore, no increased risk of WFD deterioration anticipated and risk remains as amber adverse effect.</p>
GB106040018160: Lower Eden	Sutton and East Surrey (SES) and Thames Water	<ul style="list-style-type: none"> • Sutton and East Surrey Water: Bough Beech reservoir – raising • South East Water: New Bulk Supply - SESW to SEW RZ1 Transfer - Bough Beech to Riverhill SR (10MI/d) 	<p>Bough Beech reservoir – raising option intersects the 500m water company boundary within Lower Eden waterbody. SESW to SEW RZ1 transfer option also occurs within this waterbody although it does not intersect 500m water company boundary. Activities associated with these options include the extension of a new reservoir, increased surface water abstraction to facilitate extension and below ground structures associated with new pipelines and crossings. The combined impacts of the two options would not lead to an increase in the impact described within Bough Beech reservoir extension option and would not lead to an increased risk of WFD deterioration. Risk to the waterbody remains as major adverse effect (as per Bough Beech reservoir option).</p>
GB40601G501700: North Kent Swale Chalk	South East and Southern Water	<ul style="list-style-type: none"> • Southern Water: Desalination - Isle of Sheppey (20MI/d) 	<p>Both Desalination: Isle of Sheppey (20MI/d) and Recycling: Sittingbourne industrial reuse (7.5Mld) intersect the 500m boundary corridor in the North</p>

Waterbody impacted	Water companies	Option(s)	Comment
		<ul style="list-style-type: none"> • Southern Water: Recycling - Sittingbourne industrial reuse (7.5Mld) • South East Water: New Company Transfer - RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) • Southern Water: Transfer - Utilise full existing KME-KTZ transfer capacity (9MI/d) 	<p>Kent Swale waterbody. Other options within this waterbody (outside of the 500m boundary corridor) are the New Company Transfer: RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) and Transfer: Utilise full existing KME-KTZ transfer capacity (9MI/d) options. Activities associated with these four options include the installation of new pipelines, below ground structures, refurbishment of existing groundwater sources and modification of an existing WTW. It is anticipated that impact on the waterbody will not exceed that already described in Recycling: Sittingbourne industrial reuse (7.5Mld) option assessment when considering the in-combination effect of the Best Value Plan options. This is due in part to the minor and localised impacts associated with the other three options and the difference in construction periods leading to an assumed reduced cumulative impact. Therefore, no increased risk of WFD deterioration anticipated and risk remains as amber adverse effect.</p>
GB40602G500200: North Kent Tertiaries	South East and Southern Water	<ul style="list-style-type: none"> • Southern Water: Desalination - Isle of Sheppey (20MI/d) • Southern Water: Recycling - Sittingbourne industrial reuse (7.5Mld) • South East Water: New Company Transfer - RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) 	<p>Both Desalination: Isle of Sheppey (20MI/d) and Recycling: Sittingbourne industrial reuse (7.5Mld) intersect the 500m boundary corridor in the North Kent Tertiaries waterbody. The other option within this waterbody (outside of the 500m boundary corridor) is the New Company Transfer: RZ8 to RZ6 Transfer - Canterbury to Maidstone (10 MI/d) options. Activities associated with these three options include the installation of new pipelines, below ground structures, refurbishment of existing groundwater sources and modification of an existing WTW. It is anticipated that impact on the waterbody will not exceed that already described in the Recycling: Sittingbourne industrial water reuse (7.5MI/d) option assessment when</p>

Waterbody impacted	Water companies	Option(s)	Comment
			considering the in-combination effect of the Best Value Plan options. This is due in part to the minor and localised impacts associated with the other three options and the difference in construction periods leading to an assumed reduced cumulative impact. Therefore, no increased risk of WFD deterioration anticipated and risk remains as amber adverse effect .
GB40701G505200: Chichester Chalk	Portsmouth and Southern Water	<ul style="list-style-type: none"> Portsmouth Water: SRN Source D To Havant Thicket: 50MI/d Southern Water: Havant Thicket To Pulborough WTW: 50MI/d Southern Water: Recycling - Littlehampton WwTW (15MI/d) Southern Water: Drought option - North Arundel Drought Permit/Order (2025 onwards) Portsmouth Water: Drought Permit: Source S 	Both SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d cross the 500m water company boundary within the Chichester Chalk waterbody. These options use the same stretch of new pipeline (in opposite directions) and associated crossings, so impacts are assumed to be the same for both options. Recycling: Littlehampton WwTW (15MI/d) option also crosses the boundary and involves a new pipeline and crossings. Drought option: North Arundel Drought Permit/Order (2025 onwards) and Drought Permit: Source S options both impact the groundwater through increased abstractions (outside of RAA rates) to be used as emergency sources in droughts. They are both scheduled to be ready for operation by 2026 and it is assumed that the operational impact (if options were used at same time) could lead to a temporary, increased risk of WFD deterioration for the waterbody. This is subject to further assessment and review of Portsmouth Water Level 2 assessments when made available.

4.1.3 Conclusions

A WFD in-combination effects assessment has been carried out for the WRSE Best Value Plan options which occur across different water company boundaries. The assessment identified 24 water bodies impacted by two or more Best Value Plan options across water company boundaries. Of these water bodies, 18 are assessed that there is no risk of in-combination effects and thus no increased risk of WFD deterioration within these waterbodies.

In six of the remaining waterbodies, in combination effects have been identified in GB40701G505200: Chichester Chalk, which could lead to an increase in the risk of WFD deterioration. For the other five waterbodies in combination effects have been identified but it does not change the overall WFD risk to the waterbody.

Of the options reviewed as part of this cross-water company boundary cumulative effects assessment the following options were identified as being at risk of WFD deterioration. Further discussion on these options can be found in the relevant WRMP reports:

- Southern Water: Recycling - Sittingbourne industrial reuse (7.5Mld);
- Southern Water: Desalination - River Thames estuary (20Ml/d);
- South East Water: Groundwater Licence Trade – Halling;
- Southern Water: Recycling - Medway WwTW (12.8Ml/d);
- Southern Water: Desalination - Isle of Sheppey (20Ml/d);
- Thames Water: Groundwater Development - Southfleet & Greenhithe;
- Thames Water: Groundwater Development – Addington;
- Affinity Water: Deal Supply Scheme;
- Affinity Water: Dover Constraint Removal;
- Sutton and East Surrey Water: Bough Beech reservoir – raising
- South East Water: New Bulk Supply - SESW to SEW RZ1 Transfer - Bough Beech to Riverhill SR (10Ml/d)

4.2 Best Value Plan options selected post 2050

4.2.1 Potential combined effects from post 2050 options only

Table 4.4 presents the one water body which is impacted by more than one of the post 2050 Best Value Plan options across water company boundaries. The in-combination effects assessment has shown that in this water body, in-combination Best Value Plan option activities could lead to a risk of WFD deterioration.

The in-combination effects assessment has been carried out using either the Level 1 or Level 2 WFD assessments, depending on what was available at the time of reporting. Level 1 and 2 assessments were available for Affinity Water, Thames Water and some South East Water WRMP options. Only Level 1 assessments were available for Portsmouth Water, SES Water, Southern Water and some South East Water options.

Table 4.4: Potential combined effects from post 2050 options only

Waterbody impacted	Water companies	Option(s)	Comment
GB106039023460: Wandle (Croydon to Wandsworth) and the R. Graveney	Thames and Sutton and East Surrey Water	<ul style="list-style-type: none"> • Thames Water: Groundwater Development - Merton Recommissioning • Sutton and East Surrey Water: 	The Groundwater Development – Merton Recommissioning option activities include the modification of an existing WTW and the use of an existing groundwater licence outside of recent actual abstraction rates. The drought permit also utilises groundwater

Waterbody impacted	Water companies	Option(s)	Comment
		Outwood Lane drought permit	sources, with proposed temporary removal of restrictions during drought periods. It is assumed that in combination impact associated with these options will be most adverse on the groundwater body, but this subject to the provision of the Level 2 assessment. In combination effect on the surface water body could lead to a reduction in flow which could lead to a WFD deterioration.

4.2.2 Potential combined effects from the operation of scheme pre 2050 and those post 2050

There is the potential for long term operational effects from some of the pre 2050 options, which could therefore, lead to in-combination effects with options brought forward post 2050. This section sets out the potential crossover in-combination effects between the pre 2050 options and the post 2050 across water company boundaries.

Table 4.5 presents a list of water bodies which are impacted by more than two or more pre and post 2050 Best Value Plan options across water company boundaries. The in-combination effects assessment has shown that for the following water bodies, in-combination Best Value Plan option activities are not anticipated to lead to a risk of WFD deterioration.

Table 4.5: Water bodies where in-combination effects from pre and post 2050 Best Value Plan options are not anticipated to lead to a risk of WFD deterioration

Waterbody impacted	Water companies	Option(s)	Comment
GB106040018500: Bewl	Southern and South East Water	<ul style="list-style-type: none"> South East Water: New Company Transfer - RZ1 to RZ7 Transfer - Blackhurst to Bewl (4MI/d) South East Water: AMP7 Company Transfer: RZ7 to RZ2 Transfer - Bewl to Cottage Hill (5MI/d) South East Water: New Company Transfer - RZ2 to RZ7 Transfer - Cottage Hill to Bewl (5MI/d) Southern Water: Post 2050 Recycling - Tunbridge Wells WTW 	Options within this waterbody involve the installation of new pipelines with below ground structures associated with new road and watercourse crossings and the modification of WTWs. Therefore, no long term operational impact are anticipated. The construction impacts of the post 2050 Best Value Plan option Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6MI/d) are considered unlikely to interact with the pre 2050 options as it will be brought forward in 2060, approximately 30 years later than the pre 2050 options are anticipated to be utilised. Therefore, it is assumed that the in-combination effect of these option is unlikely to lead to an increase in the risk of WFD deterioration. Risk is

Waterbody impacted	Water companies	Option(s)	Comment
		conjunctive use with Bewl reservoir (3.6Ml/d)	anticipated to remain as minor localised effect .
GB106040018250: Upper Teise	Southern and South East Water	<ul style="list-style-type: none"> • South East Water: New Company Transfer - RZ1 to RZ7 Transfer - Blackhurst to Bewl (4Ml/d) • Southern Water: Post 2050 Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) 	Options within this waterbody involve the installation of new pipelines with below ground structures associated with new road and watercourse crossings. Therefore, no long term operational impact are anticipated. The construction impacts of the post 2050 Best Value Plan option Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) are considered unlikely to interact with the pre 2050 options as it will be brought forward in 2060, approximately 30 years later than the pre 2050 option is anticipated to be utilised. Therefore, it is assumed that the in-combination effect of these options is unlikely to lead to an increase in the risk of WFD deterioration. Risk is anticipated to remain as minor localised effect .
GB106040018110: Alder Stream and Hammer Dyke	Southern and South East Water	<ul style="list-style-type: none"> • South East Water: New Company Transfer - RZ1 to RZ6 Transfer - Blackhurst to Aylesford (4Ml/d) • Southern Water: Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) 	Options within this waterbody involve the installation of new pipelines with below ground structures associated with new road and watercourse crossings. Therefore, no long term operational impact are anticipated. The construction impacts of the post 2050 Best Value Plan option Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) are considered unlikely to interact with the pre 2050 options as it will be brought forward in 2060, approximately 20 years later than the pre 2050 option is anticipated to be utilised. Therefore, it is assumed that the in-combination effect of these options is unlikely to lead to an increase in the risk of WFD deterioration. Risk is anticipated to remain as minor localised effect .

Table 4.6 presents a list of water bodies which are impacted by more than one of the Best Value Plan options across different water companies, where a risk of deterioration has been identified for one or

more of the individual options. The in-combination effects assessment has shown that for the following water bodies, in-combination Best Value Plan option activities are not anticipated to lead to an increase in the risk of WFD deterioration, over that identified for one or more of the individual options. Following further investigation, if mitigation is applied to any of these options then these in-combination effects would need to reassessed.

Table 4.6: Water bodies where in-combination effects from pre and post 2050 Best Value Plan options are not anticipated to lead to a risk of WFD deterioration

Waterbody impacted	Water companies	Option(s)	Comment
GB106039023460: Wandle (Croydon to Wandsworth) and the R. Graveney	Thames and Sutton and East Surrey Water	<ul style="list-style-type: none"> Thames Water: Groundwater Development - Merton Recommissioning Sutton and East Surrey Water: Outwood Lane drought permit Sutton and East Surrey Water: Hackbridge drought permit Sutton and East Surrey Water: Kenley and Purley drought permit Sutton and East Surrey Water: Transfer from Merton (TW) to SES Boundary at 15MI/d Thames Water: TWRM extension - Hampton to Battersea – Construction 	<p>Transfer from Merton (TW) to SES Boundary at 15MI/d and the R. Graveney. TWRM extension – Hampton to Battersea – Construction option involve new pipelines and below ground structures within this waterbody.</p> <p>The Groundwater Development – Merton Recommissioning option activities include the modification of an existing WTW and the use of an existing groundwater licence outside of recent actual abstraction rates. Each drought permit impacts the same watercourse, with proposed removal of hands-off flow restrictions during drought periods. A cumulative impacts assessment has already been carried out within the drought permit assessment report which states ‘Hydrological analysis has indicated that operation of SES Water’s three drought permits (Outwood Lane, Hackbridge and Kenley & Purley) concurrently will not significantly impact surface flows in the River Wandle. Therefore, no cumulative effect is expected and as such an increased risk of WFD deterioration is not anticipated. The risk to the waterbody is not anticipated to exceed that already described in the Merton Recommissioning option. Risk remains as an amber adverse effect.</p>
GB106040018410: Somerhill Stream	Southern and South East Water	<ul style="list-style-type: none"> South East Water: New Company Transfer - RZ1 to RZ6 Transfer - Blackhurst to Aylesford (4MI/d) 	Option activities within this waterbody involve the installation of new pipelines with below ground structures associated with new road and watercourse crossings as well as the cessation of an existing discharge to a watercourse (and

Waterbody impacted	Water companies	Option(s)	Comment
		<ul style="list-style-type: none"> Southern Water: Post 2050 Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) 	modification of WTW). The post 2050 Best Value Plan option Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) will only lead to short term construction impacts and is considered unlikely to interact with the pre 2050 options as it will be brought forward in 2060, approximately 20 years later than the pre 2050 option. Therefore, it is assumed that the in-combination effect of these options is unlikely to lead to an increase in the risk of WFD deterioration outside of what is described in Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d) option assessment. Risk is anticipated to remain as amber adverse effect .
GB106040018160: Lower Eden	Sutton and East Surrey (SES) and Thames Water	<ul style="list-style-type: none"> Sutton and East Surrey Water: Bough Beech reservoir – raising South East Water: New Bulk Supply - SESW to SEW RZ1 Transfer - Bough Beech to Riverhill SR (10Ml/d) Sutton and East Surrey Water: River Eden May drought permit Sutton and East Surrey Water: River Eden Summer drought permit 	Activities associated with these options include the extension of a new reservoir, increased surface water abstraction to facilitate extension and below ground structures associated with new pipelines and crossings. In addition to this, each drought permit potentially impact the same waterbody (Lower Eden), with proposed removal of constraints from abstractions during drought. The combined impacts of the two options and two proposed drought permits would not lead to an increase in the impact described within Bough Beech reservoir extension option. Risk to the waterbody remains as major adverse effect (as per Bough Beech reservoir option).

This in-combination effects assessment has not identified any waterbody impacted by more than one post-2050 option that are likely to lead to an increase in the risk of WFD deterioration.

4.2.3 Conclusions

A WFD in-combination effects assessment has been carried out to assess WRSE Best Value Plan post 2050 options. The assessment identified one water body which is impacted by two or more Best Value Plan post 2050 options from different water companies. The in-combination effects assessment

suggested that there is no risk of in-combination effects and thus no risk of WFD deterioration within this waterbody.

Further assessment has been carried out to assess in-combination effects from the operation of pre 2050 options and construction/operation of the post 2050 options. The assessment identified six water bodies impacted by two or more Best Value Plan options from different water companies. The in-combination assessment finds that three of these waterbodies have no risk WFD deterioration. For the other three waterbodies in combination effects have been identified but it does not change the overall WFD risk to the waterbody.

Of the options reviewed as part of this cross-water company boundary cumulative effects assessment the following options were identified as being at risk of WFD deterioration. Further discussion on these options can be found in the relevant WRMP reports:

- Thames Water: Groundwater Development - Merton Recommissioning;
- Sutton and East Surrey Water: Outwood Lane drought permit; and
- Southern Water: Post 2050 Recycling - Tunbridge Wells WTW conjunctive use with Bewl reservoir (3.6Ml/d).

5 Next Steps

Areas for future focus for any options carried forward include:

- Consultation with the Environment Agency to present and discuss key WFD risks and proposed approach to improving certainty of assessments;
- Collation and review of Heavily Modified Water body (HMWB) measures, programme of measures and mitigation measures assessments information from the Environment Agency for inclusion into the assessment of potential impediment to obtaining Good Ecological Potential (GEP);
- Collation and review of detailed baseline data concerning WFD biological, physicochemical and hydro-morphological elements identified as being at yellow, amber, or red risk in the Level 2 assessments. This may include existing Environment Agency and water company long term WFD and water quality monitoring data within the relevant water bodies, and targeted baseline surveys being undertaken specifically for the option assessments;
- Further development of conceptual models linking together how potential hydrological changes (from abstractions or discharges) could influence water quality and the sensitivity of aquatic communities to those changes. This will include a diagrammatic/visual presentation of linkages between abstraction impacts and the direct and indirect effects on physico-chemical and biological WFD status elements, indicating thresholds of WFD classes or tolerance to change. This step would aid consultation and discussion with stakeholders and the requirement for/scoping of any detailed modelling;
- Further information on the design and operation of the options;
- Update to Level 2 WFD assessments to incorporate additional information;
- Update to these in-combination assessments when all Level 2 assessments are available; and
- Update the in-combination assessments as individual options are progressed and mitigation is included in the design to ensure no in-combination effects remain.

It is noted that the Cycle 3 River Basin Management Plans (RBMPs) are also due to be published in late 2022, which may bring about changes in the baseline status and objectives for water bodies. Where necessary, changes will need to be accounted for in updates to the WFD assessments at the next stage.