Draft Water Resources Management Plan 2024

Technical Appendix D – Water Framework Directive Assessment

Contents

Tables

1 Introduction

1.1 Overview

Water companies in England and Wales are required to produce a Water Resources Management Plan (WRMP) every five years. The WRMP sets out how a company intends to maintain the balance between supply and demand for water over a minimum of 25 years. In the development of a WRMP, water companies must follow the Environment Agency (EA) Water Resources Planning Guideline[1] and consider broader government policy objectives; ensuring the plan sets out how the company intends to maintain the balance between supply and demand for water over the long-term planning horizon, increasing security of supply in each of the water resource zones making up its supply area.

The Thames Water (TW) supply area is predominantly situated within the Water Resources South-East (WRSE) regional planning area. Therefore, all the water resource options considered as part of the Thames Water Resource Management Plan 2024 (WRMP24) will be sourced from the existing selected options as part of the regional plan. Therefore, efficiencies between the regional planning and WRMP process can be achieved. For the Thames Water WRMP24 the Water Framework Directive (WFD) assessments will focus on the local scale, drawing on the higher-level work previously completed for the regional plans where applicable.

As part of the environmental assessment process to support the development of the WRSE Regional Plans and Thames Water WRMP24, Water Framework Directive (WFD) Level 1 and where needed, Level 2 assessments have been completed. Assessment of the water resource options should be undertaken to identify potential option impacts on the water environment while also considering potential mitigation measures.

This annex supports the Environment Assessment Report (EAR) that accompanies the TW Water Resource Management Plan (WRMP) submission to regulators. The annex presents the findings of a Water Framework Directive (WFD) assessment applied to the Thames Water WRMP options.

1.2 Thames Water WRMP options

As part of the WRMP process, several alternative versions of the WRMP plan are developed to address different concerns, where the most suitable combination of options are selected via investment modelling and post processing for each proposed scenario.

The WFD assessments have been carried out for options selected under Situation 4 of the planning process. This includes assessments of Best Value Plan options, and as relevant, Least Cost and Best Environmental and Societal (up to 2050). Further environmental assessment (Level-2) and the assessment of cumulative effects provided primarily focusses on schemes up to 2050, with schemes post-2050 considered on a lighter touch. This is because post-2050 there is less certainty regarding the status/condition of environment and any assessments would be undertaken in an overly precautionary manner.

Table 1.1 summarises the 21 WRMP options scoped in for WFD Level 1 screening, providing a general overview of the activities associated with each of them.

Table 1.1: Thames Water WRMP BVP Options

Option ID	Option name	Description overview
TWU_SWX_HI-GRW_RE1_ALL_britwell roc	Britwell Removal of Constraints	Construction of a new run to waste facility to allow operation of existing borehole.

Option ID	Option name	Description overview
TWU_LON_HI-TFR_LON_ALL_lockwood ps-kgv res	TLT extension from Lockwood PS to King George V Reservoir intake	New connection from Lockwood PS to the intake of KGV reservoir.
TWU_LON_HI-TFR_LON_ALL_hampton-battersea	TWRM extension - Hampton to Battersea	New ring main tunnel from Hampton to Battersea.
TWU_SWX_HI-IMP_SWX_ALL_wessextoswoxflax	Wessex Water to SWOX (Flaxlands)	Transfer 2.9Ml/d from Wessex Water to Flaxlands. One new main from Minety SR (Wessex) to Flaxlands SR (TW). Also included is the transfer main from Charlton WTW to Minety SR.
TWU_SWX_HI-TFR_HEN_ALL_henley-swox5	Henley to SWOX – 5 Ml/d	The option is for one new main from New Farm service reservoir (Henley) to Nettlebed service reservoir (SWOX). This will require a new 5.9km, 350mm diameter main from New Farm to Nettlebed and a new pumping station at New Farm. 5Ml/d capacity.
TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby	ASR Horton Kirby	Construction of pipelines between two existing ASR boreholes in the Lower Greensand aquifer to an existing WTW at Horton Kirby in Kent. Water abstracted from existing Chalk aquifer boreholes (via the mains supply) will be recharged into the two ASR boreholes during periods of water surplus and abstracted when needed and treated at the WTW.
TWU_SWA_HI-GRW_ALL_ALL_datchet do	Datchet Increase DO	Increase capacity of Datchet site.
TWU_HEN_HI-TFR_KVZ_ALL_tw(kv)to(hen)con	Thames Water (Kennet Valley) to Thames Water (Henley) Conveyance	Potable Water Transfer - Thames Water (Kennet Valley) to Thames Water (Henley) Conveyance.
TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	Southfleet/Greenhithe (new WTW)	Southfleet-Greenhithe licence disaggregation and new headworks and pumping station at borehole sites and new 3km main from Greenhithe to new WTW. DO benefit is 8Ml/d average, 9Ml/d peak.
TWU_LON_HI-GRW_ALL_ALL_addington gw	Groundwater Addington	New abstraction borehole & upgrade to WTW. DO benefit 1Ml/d average, 1.5Ml/d peak.
TWU_SWX_HI-GRW_ALL_ALL_woods farm do	Woods Farm Increase DO	New borehole to be constructed on site to bring DO up to licence (this is an additional 2.4Ml/d to average licence of 4.99Ml/d or an additional 2.91Ml/d to peak licence of 5.5Ml/d). The option includes a new borehole and a 1.4km raw water pipeline from the new satellite borehole to Woods Farm WTW.
TWU_GUI_HI-TFR_RZ5_ALL_sewtogui	South East Water to Guildford	10Ml/d transfer from South East Water (Hogsback) to Mount SR Guildford.
TWU_LON_HI-ROC_WT1_CNO_kemptonwtw150	Kempton - 150 - Construction	Treatment to drinking water standards of 150Ml/d of raw water from the West London reservoirs.
TWU_SWX_HI-GRW_ALL_ALL_moulsford gw	Moulsford 1	Construction of an abstraction borehole in the unconfined Chalk north of Streatley on the west bank of the River Thames. Water abstracted from the borehole will be treated at the existing Cleeve water treatment works (WTW) located on the eastern side of the River Thames. DO benefit is 3.5Ml/d peak and 2Ml/d average.
TWU_SWA_HI-TFR_SWX_ALL_swoxswa48	SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)	Abingdon WTW to Long Crendon to supply SWA.
TWU_SWX_HI-TFR_SWA_ALL_tw(swa)to(swx)con	Thames Water (SWA) to Thames Water (SWOX) Conveyance	Potable Water Transfer -Thames Water (SWA) to Thames Water (SWOX)
TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney	River Thames to Fobney Transfer	40Ml/d raw water transfer option from River Thames to Fobney WTW to supply Kennet Valley WRZ.

Option ID	Option name	Description overview
TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe	Abingdon to Farmoor Reservoir Pipeline	Construction of a transfer pipeline to convey 24Ml/d of raw water between a proposed reservoir at Abingdon and the existing Farmoor reservoir, in the SWOX WRZ. (Note: Abingdon reservoir creation is not part of this option). The engineering scope includes the provision of a booster pump station at the proposed Abingdon Reservoir site to facilitate the transfer. Treatment would be provided at the existing WTW.
TWU_GUI_HI-GRW_ALL_ALL_dapdune lic disagg	Dapdune Licence Disaggregation	Licence disaggregation. DO benefit 0Ml/d average, 2.2Ml/d peak
TWU_KVZ_HI-GRW_ALL_ALL_mortimer recomm	Mortimer Disused Source (Recommission)	Refurbishment of two disused abstraction boreholes located on-site at the existing, but disused Mortimer water treatment works (WTW). Water abstracted from the boreholes will be treated at the disused WTW which will be upgraded for ammonia and iron removal and recommissioned. DO benefit 4.5 Ml/d average and peak
TWU_LON_HI-GRW_ALL_ALL_merton recommission	Merton recommissioning	Post 2050 option: the recommissioning and upgrade of the Merton Abbey WTW in order to treat the maximum peak DO of 8Ml/d from the Merton Abbey Well.

In addition to the options set out above the Thames Water BVP also includes 11 options which form part of various Strategic resource options (SRO). These have been assessed under the individual SRO projects, but a summary of these is provided in this report for completeness. The 11 options are set out in Table 1.2 below.

Table 1.2: Thames Water WRMP BVP SRO based options

Option ID	Option name	SRO project
TWU_KVZ_HI-TFR_T2S_ALL_t2st cul to speen	T2ST Culham to Speen transfer	Thames to Southern Transfer SRO (T2ST). This option is part of the T2ST pipeline transferring water from River Thames to the south. This option is a branch of the wider T2ST scheme.
TWU_STR_HI-RSR_RE1_CNO_abingdon100(lon)	Reservoir Abingdon 100 (Lon) - Construction	South East Strategic reservoir option (SESRO). These three options form part of the SESRO project for a new 100Mm^3 reservoir in the south east.
TWU_SWX_HI-ROC_WT1_CNO_abingdon wtw ph1	Abingdon WTW Ph1 - Construction	
TWU_SWX_HI-ROC_WT2_ALL_abingdon wtw ph2	Abingdon WTW Enhanced	
TWU_STT_HI-IMP_STT_CNO_sttpipe500(lon)	Raw Water Transfer Deerhurst to Culham 500 Ml/d (Lon only) - Construction	Severn to Thames transfer SRO (STT). These four options all form parts of the proposed transfer pipeline of 500Ml/d from the River Severn to the River Thames.
TWU_STT_HI-RAB_RE1_ALL_p9-500-vyrnwy_100_b	500: Vyrnwy Reservoir river release (75 Mld) and 25 Mld of Bypass (105Mld)	
TWU_STT_HI-REU_RE1_ALL_p5-500-neth_p35	500: Netheridge STW effluent diversion (35Mld) - Deerhurst Pipeline	
TWU_U7T_HI-RAB_RE1_ALL_p1-500-unsupported	500: Unsupported flow	
TWU_TED_HI-RAB_RE1_CNO_teddington dra 75	Teddington DRA 75 Ml/d - Construction	London Reuse: Teddington DRA 75 Ml/d SRO. A portion of the final effluent from Mogden STW would be subject to tertiary treatment and

Option ID	Option name	SRO project
TWU_LON_HI-TFR_LON_ALL_teddingtondrated/tlt	Direct River Abstraction – Teddington to Thames Lee Tunnel Shaft 75Ml/d	transferred in a tunnel for discharge into the River Thames upstream of Teddington weir. Additional abstraction from the Thames upstream of the new outfall. Abstracted water would be pumped into the nearby Thames Lee Tunnel for transfer to Lockwood Reservoir, part of the Lee Valley reservoirs in East London.
TWU_LON_HI-TFR_LON_ALL_teddingtondramog/ted	Mogden to Teddington outfall	

Six additional options which form parts of these SRO are selected post 2050, however the WFD assessments for these SROs include all these options and no additional assessment is needed.

The final two options included in the Thames Water WRMP BVP are two drought plan options. These options are set out in Table 1.3 below.

Table 1.3: Thames Water WRMP BVP Drought plan options

Option ID	Option name	SRO project
TWU_SWX_RE-DRP_ALL_ALL_dp-gatehampton-swox	DP-Gatehampton-SWOX	The Gatehampton licence includes a flow constraint which means abstraction must be reduced from the licence quantity of 105Ml/d to at or below 101.5Ml/d when flow in the River Thames at Reading Gauging Station falls below 400Ml/d for 5 days. The Gatehampton SWOX drought plan option is to change the Gatehampton licence to allow abstraction to remain at 105Ml/d even when the flow constraint is in place, during drought periods.
TWU_KVZ_RE-DRP_ALL_ALL_dp-playhatch-kv	DP-Playhatch KV	The Playhatch licence has an annual average abstraction of 7.27Ml/d and a peak abstraction of 8.2Ml/d. The Playhatch Kennet Valley drought plan option is to increase the peak licence to 12.3Ml/d, during drought periods.

The WFD assessments for these drought plan options have been carried out using the methodology set out in the Thames Water Drought Plan 2022 Environmental Assessment Methodology[1] and the assessments carried out and are presented in Drought Plan Environmental Assessment Reports. A summary of the outcomes of these assessments have been included in this report

1.3 Methodology

1.3.1 The Water Framework Directive

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

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 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"

[1] Ricardo, October 2020. Thames Water Drought Plan 2022. Environmental Assessment Methodology.

for natural surface and groundwater bodies, artificial water bodies (AWB) 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. AWB and HMWBs must achieve good ecological potential and good chemical status. Regulation 13 also sets out the principal of no deterioration, providing protection from the deterioration of water status/potential. In Regulation 15 the criteria for the designation of AWB or HMWBs 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.

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?

1.3.2 Approach to WFD assessment for WRMP24 Options

The All Company Working Group (ACWG) has developed a consistent framework for undertaking WFD assessments to demonstrate that options will not cause deterioration in status of any WFD water bodies. The assessment considers mitigation that would need to be put in place to protect water body status. The assessment also considers WFD future objectives. This framework was developed to ensure consistency in environmental assessment across water companies for SRO development across the England and Wales. To ensure consistent comparison between WRMP options, the same framework has been used for the assessment of all WRMP options.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact assessment. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment based 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*.

1.3.3 Level 1 – basic screening

The first stage of WFD assessment was completed for all options. Level 1 assessment follows these steps:

- Identify affected water bodies;
- 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; and
- Calculate a screening score (using a 6-point scale from -2 to 3) to 'screen out' water bodies 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 water body will need to be taken forward into level 2 screening.

The scoring system used is set out in below in Table 1.4.

Table 1.4: Impact scoring system used for 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.
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.

The outcomes for the Thames Water WRMP options are summarised in Section 2 and Annex A. Where waterbodies and option impacts were screened in for further assessment, these have been taken forward to Level 2 assessment.

1.3.4 Level 2 – detailed impact screening

The second stage of WFD assessment has been completed for options that were screened in at Level 1, following the 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 *(note, confidence/certainty expected to be low during this initial WRMP assessment and increase over time).* Where the confidence levels are medium or low, the requirements for further data or design information in order to raise this confidence level for future gates will be listed*;*
- Identification of further mitigation needs;
- Assessment of impacts after mitigation (scoring on a 6-point scale); and
- Identification of activities to improve certainty of assessment outcomes.

The WFD Level 2 assessment outcomes for the Thames Water WRMP BVP situation four options are summarised in Section 2.3.4 and Annex B.

Where waterbodies and option impacts have been identified, recommendations have been made for increasing the confidence in the assessment. This is expected to be by increasing the level of detail available during later stages of option development if the relevant options are progressed. In combination assessments where different option delivery is interdependent would also be required. Recommendations are included in Section 6.4.1.

1.3.5 Cumulative effects assessment

For WFD, a cumulative effects assessment has been carried out for the Thames Water WRMP24 BVP options (pre-2050 options). The cumulative effects assessment aims to identify and assess any additional, cumulative risk of deterioration in WFD status on water bodies caused by activities from multiple options taking place within them.

All water bodies scoped in and assessed for each option at Level 1 are compiled, in addition to information on major planning developments or allocations (hereafter referred to as planning projects) situated within a 2km buffer of these options. From here an intra-plan and inter-plan effects assessment is undertaken using this information. A *source – pathway - receptor* approach has been utilised to identify where there is the potential for cumulative effects within a waterbody. Methodology for each assessment is outlined below.

1.3.5.1 Intra-plan effects assessment

The intra-plan effects assessment identifies and assesses any risk of deterioration on water bodies which are potentially impacted by more than one BVP option. The water bodies identified in the Level 1 assessments of all BVP options are collated, and then sorted to identify where more than one BVP option potentially impacts on the same water body. For each water body where this occurs, a review is carried out of all activities occurring within the water body. This determines if the impact of the proposed activities associated with all options could lead to an increased risk of WFD deterioration. Where a water body is identified to be at an increased risk of WFD deterioration, a new cumulative WFD assessment is completed where all option activities are assessed together, and a new impact score assigned.

1.3.5.2 Inter-plan effects assessment

The inter-plan effects assessment is carried out to determine the cumulative impact of the BVP option activities along with any relevant planning projects identified on impacted water bodies.

All planning allocations, planning applications and major projects such as DCOs, within 500m have been identified. For each planning project, assessment is made on whether the project could lead to impacts on WFD waterbodies. For larger DCOs this review makes use of any existing WFD assessments which have been carried out for the planning application. For other planning allocations or applications where no WFD assessment has been carried out professional judgement is used to identify potential for impacts on WFD. Any planning projects

where no risk of deterioration is identified has been discounted from the assessment, and the relevant planning projects passed into the next stage of the review.

Any water body where one or more BVP option and one or more relevant planning projects occur within the same water body has the corresponding option assessments and planning project information reviewed to determine if the cumulative impact of the proposed activities could lead to an increased risk of WFD deterioration. Where a water body is identified to be at an increased risk of WFD deterioration, a new cumulative WFD assessment is completed where all option activities and planning project activities are assessed together, and a new impact score assigned.

1.4 Limitations and assumptions

As the options set out in the WRMP are still in the early stages of design development a precautionary approach has been exercised because of residual uncertainty. The WFD assessment has 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 River Basin Management Plans (RBMPs). The RBMPs are anticipated to be updated at the end of 2022 and will be based on the 2019 WFD data. The 2019 WFD baseline data was released in late 2020 but will not become the legal baseline until the updated RBMP is published. To make sure of consistency, the 2015 data has been used in this assessment, but acknowledge that this will need to be updated to the 2019 status once the RBMPs are published.
- Assessment assumes pipelines are underground (directionally drilled or pipe-jacked beneath any larger watercourses, roads or railways and by bypass and trenching under small roads and watercourses) and therefore will not cross watercourses above ground or cause direct impacts.
- This assessment has only considered the impacts associated directly with the options at this stage and does not include the impacts of other water company WRMP options.
- The geographical extent of the WFD assessment has been limited to the water bodies where abstractions take place. 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. This assumption will need to be reviewed as additional hydrological studies are undertaken.

2 WRSE Water Framework Directive findings (WFD ACWG Level 1)

2.1 Updates to the options since WRSE undertook their review

The WRSE assessment was undertaken on an early iteration of the options. Further changes have been made to the assessments since these were assessed by WRSE. An overview of the changes made to the WRSE assessments are presented in Table 2.1. No significant changes were made to the routes or options assessed by WRSE.

Table 2.1: Overview of the changes made to the options since WRSE assessment

Option ID	Option name	Changes since WRSE assessment
TWU_SWX_HI-GRW_RE1_ALL_britwell roc	Britwell Removal of Constraints	• Addition of groundwater body to assessment
TWU_LON_HI-TFR_LON_ALL_lockwood ps-kgv res	TLT extension from Lockwood PS to King George V Reservoir intake	• *No changes*
TWU_LON_HI-TFR_LON_ALL_hampton-battersea	TWRM extension - Hampton to Battersea	• Addition of groundwater body to assessment and update of abstraction assessment
TWU_SWX_HI-IMP_SWX_ALL_wessextoswoxflax	Wessex Water to SWOX (Flaxlands)	• *No changes*
TWU_SWX_HI-TFR_HEN_ALL_henley-swox5	Henley to SWOX – 5 Ml/d	• *No changes*
TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby	ASR Horton Kirby	• *No changes*
TWU_SWA_HI-GRW_ALL_ALL_datchet do	Datchet Increase DO	• Review and reassessment of impact on groundwater from increase in recent actual (RA) abstraction
TWU_HEN_HI-TFR_KVZ_ALL_tw(kv)to(hen)con	Thames Water (Kennet Valley) to Thames Water (Henley) Conveyance	• *No changes*
TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	Southfleet/Greenhithe (new WTW)	• Addition of groundwater body to assessment
TWU_LON_HI-GRW_ALL_ALL_addington gw	Groundwater Addington	• Addition of groundwater body to assessment and update of abstraction assessment
TWU_SWX_HI-GRW_ALL_ALL_woods farm do	Woods Farm Increase DO	• update of abstraction assessment
TWU_GUI_HI-TFR_RZ5_ALL_sewtogui	South East Water to Guildford	• *No changes*
TWU_LON_HI-ROC_WT1_CNO_kemptonwtw150	Kempton - 150 - Construction	• Addition of groundwater body to assessment
TWU_SWX_HI-GRW_ALL_ALL_moulsford gw	Moulsford 1	• *No changes*
TWU_SWA_HI-TFR_SWX_ALL_swoxswa48	SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)	• *No changes*
TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney	River Thames to Fobney Transfer	• *No changes*
TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe	Abingdon to Farmoor Reservoir Pipeline	• Addition of groundwater and lake waterbodies to assessment
TWU_GUI_HI-GRW_ALL_ALL_dapdune lic disagg	Dapdune Licence Disaggregation	• *No changes*

Option ID	Option name	Changes since WRSE assessment
TWU_KVZ_HI-GRW_ALL_ALL_mortimer recomm	Mortimer Disused Source (Recommission)	• *No changes*
TWU_SWX_HI-TFR_SWA_ALL_tw(swa)to(swx)con	Thames Water (SWA) to Thames Water (SWOX) Conveyance	• *No changes*
TWU_LON_HI-GRW_ALL_ALL_merton recommission	Merton recommissioning	• *No changes*

2.2 Summary of WFD ACWG Level 1 outputs

2.2.1 Britwell Removal of Constraints

The Level 1 WFD assessment covered two water bodies for this option. The outcomes indicated further assessment would be necessary for one waterbody: GB40601G604100 Chiltern Chalk Scarp (GW).

Table 2.2: WFD Level 1 assessment outcomes for Britwell Removal of Constraints

Britwell Removal of Constraints	
Option ID	TWU_SWX_HI-GRW_RE1_ALL_britwell roc
Option Description	Construction of a new run to waste facility to allow operation of existing borehole
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB106039023740 - Chalgrove Brook
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB40601G604100 Chiltern Chalk Scarp (GW).

2.2.2 TLT extension from Lockwood PS to King George V Reservoir intake

The Level 1 WFD assessment covered seven waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.3: WFD Level 1 assessment outcomes for TLT extension from Lockwood PS to King George V Reservoir intake

TLT extension from Lockwood PS to King George V Reservoir intake	
Option ID	TWU_LON_HI-TFR_LON_ALL_lockwood ps-kgv res
Option Description	New connection from Lockwood PS to the intake of KGV reservoir.
Number of waterbodies passing WFD assessment	7
Waterbodies passing WFD assessment	GB106038077852: Lee (Tottenham Locks to Bow Locks/Three Mills Locks) GB106038027950: Lea Navigation Enfield Lock to Tottenham Locks GB106038027910: Pymmes and Salmon Brooks - Deephams STW to Tottenham Locks GB106038027940: Pymmes Brook upstream Salmon Brook confluence GB106038027960: Salmon Brook upstream Deephams STW GB106038033200:Small River Lee (and tributaries)

TLT extension from Lockwood PS to King George V Reservoir intake	
	GB106038077851: Lea Navigation (Fieldes Weir to Enfield Lock)
Number of waterbodies requiring further WFD assessment	0

2.2.3 TWRM extension - Hampton to Battersea

The Level 1 WFD assessment covered six waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.4: WFD Level 1 assessment outcomes for TWRM extension - Hampton to Battersea

TWRM extension - Hampton to Battersea	
Option ID	TWU_LON_HI-TFR_LON_ALL_hampton-battersea
Option Description	New ring main tunnel from Hampton to Battersea
Number of waterbodies passing WFD assessment	6
Waterbodies passing WFD assessment	GB106039023232: Thames (Egham to Teddington) GB530603911403: Thames Upper GB106039022850: Beverley Brook (Motspur Park to Thames) and Pyl Brook at West Barnes GB106039023460: Wandle (Croydon to Wandsworth) and the Graveney GB530603911402: Thames Middle GB40603G000300: Lower Thames Gravels
Number of waterbodies requiring further WFD assessment	0

2.2.4 Wessex Water to SWOX (Flaxlands)

The Level 1 WFD assessment covered seven waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.5: WFD Level 1 assessment outcomes for Wessex Water to SWOX (Flaxlands)

Wessex Water to SWOX (Flaxlands)	
Option ID	TWU_SWX_HI-IMP_SWX_ALL_wessextoswoxflax
Option Description	Transfer 2.9 Ml/d from Wessex Water to Flaxlands. One new main from Minety SR (Wessex) to Flaxlands SR (TW). Also included is the transfer main from Charlton WTW to Minety SR.
Number of waterbodies passing WFD assessment	7
Waterbodies passing WFD assessment	GB106039023310: Lydiard Brook GB106039023650: Key (Source to Thames) GB109053027760: Woodbridge Bk - source to conf Charlton Str GB106039023620: Derry Brook GB109053027770: Charlton Str - source to conf Bristol Avon GB106039023700: Swill Brook (source to Ashton Keynes) GB40602G600600: Shrivenham Corallian

Wessex Water to SWOX (Flaxlands)	
Number of waterbodies requiring further WFD assessment	0

2.2.5 Henley to SWOX – 5 Ml/d

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.6: WFD Level 1 assessment outcomes for Henley to SWOX – 5 Ml/d

Henley to SWOX – 5 Ml/d	
Option ID	TWU_SWX_HI-TFR_HEN_ALL_henley-swox5
Option Description	The option is for one new main from New Farm service reservoir (Henley) to Nettlebed service reservoir (SWOX). This will require a new 5.9km, 350mm diameter main from New Farm to Nettlebed and a new pumping station at New Farm. 5Ml/d capacity
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB106039023233: Thames (Reading to Cookham) GB40601G601100: South-West Chilterns Chalk;
Number of waterbodies requiring further WFD assessment	0

2.2.6 ASR Horton Kirby

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one waterbody: GB40601G604100 Chiltern Chalk Scarp groundwater body.

Table 2.7: WFD Level 1 assessment outcomes for ASR Horton Kirby

ASR Horton Kirby	
Option ID	TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby
Option Description	Construction of pipelines between two existing ASR boreholes in the Lower Greensand aquifer to an existing WTW at Horton Kirby in Kent. Water abstracted from existing Chalk aquifer boreholes (via the mains supply) will be recharged into the two ASR boreholes during periods of water surplus and abstracted when needed and treated at the WTW. A new licence and discharge consent will be required from the Environment Agency to allow abstraction/recharge from the Lower Greensand aquifer.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB106040024222: Middle and Lower Darent
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB40601G501800: West Kent Darent and Cray Chalk

2.2.7 Datchet Increase DO

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.8: WFD Level 1 assessment outcomes for Datchet increase in DO

Datchet increase in DO	
Option ID	TWU_SWA_HI-GRW_ALL_ALL_datchet do
Option Description	Increase DO at Datchet site
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB106039023231: Thames (Cookham to Egham)
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB40603G000300: Lower Thames Gravels

2.2.8 Thames Water (Kennet Valley) to Thames Water (Henley) Conveyance

This option makes use of existing assets and continues a current option. Therefore, no WFD assessment is required.

2.2.9 Southfleet/Greenhithe (new WTW)

The Level 1 WFD assessment covered four waterbodies for this option. The outcomes indicated further assessment would be necessary for two waterbodies: GB40601G500300: North Kent Medway Chalk and GB40601G501800: West Kent Darent and Cray Chalk groundwater bodies.

Table 2.9: WFD Level 1 assessment outcomes for Southfleet/Greenhithe (new WTW)

Southfleet/Greenhithe (new WTW)	
Option ID	TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg
Option Description	Southfleet-Greenhithe licence disaggregation and new headworks and pumping station at borehole sites and new 3km main from Greenhithe to new WTW. DO benefit is 8 Ml/d average, 9 Ml/d peak
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB106040024222:Middle and Lower Darent GB530603911402: THAMES MIDDLE
Number of waterbodies requiring further WFD assessment	2
Waterbodies requiring further WFD assessment	GB40601G500300: North Kent Medway Chalk GB40601G501800: West Kent Darent and Cray Chalk

2.2.10 Groundwater Addington

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one waterbody: GB40601G602200: Epsom North Downs Chalk groundwater body.

Table 2.10: WFD Level 1 assessment outcomes for Groundwater Addington

Groundwater Addington	
Option ID	TWU_LON_HI-GRW_ALL_ALL_addington gw
Option Description	New abstraction borehole & upgrade to WTW. DO benefit 1 Ml/d average, 1.5 Ml/d peak
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB106039023250: Pool River
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB40601G602200: Epsom North Downs Chalk

2.2.11 Woods Farm Increase DO

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated further assessment would be necessary for one waterbody: GB40601G600900: Berkshire Downs Chalk groundwater body.

Table 2.11: WFD Level 1 assessment outcomes for Woods Farm Increase DO

Woods Farm Increase DO	
Option ID	TWU_SWX_HI-GRW_ALL_ALL_woods farm do
Option Description	New borehole to be constructed on site to bring DO up to licence (this is an additional 2.4 Ml/d to average licence of 4.99 Ml/d or an additional 2.91 Ml/d to peak licence of 5.5 Ml/d). Currently the site is only able to produce up to 2.59 Ml/d constrained by turbidity. Woods Farm WRMP24 option comprises: - Retaining the current abstraction licence with construction of a new abstraction borehole in the unconfined Chalk, 1.4 km east of the existing Woods Farm boreholes;- The option also includes a new 1.4 km raw water pipeline from the new satellite borehole to Woods Farm WTW.
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB106039030331: Thames Wallingford to Caversham
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB40601G600900: Berkshire Downs Chalk

2.2.12 South East Water to Guildford

The Level 1 WFD assessment covered ten waterbodies for this option. The outcomes indicated further assessment would be necessary for three waterbodies: GB40602G601300: Farnborough Bagshot Beds groundwater body, GB40602G601400: Chobham Bagshot Beds groundwater body and GB70610019: Basingstoke Canal water body.

Table 2.12: WFD Level 1 assessment outcomes for South East Water to Guildford

South East Water to Guildford	
Option ID	TWU_GUI_HI-TFR_RZ5_ALL_sewtogui
Option Description	10Ml/d transfer from South East Water (Hogsback) to Mount SR Guildford
Number of waterbodies passing WFD assessment	7
Waterbodies passing WFD assessment	GB106039017290: Blackwater (Hawley to Whitewater confluence at Bramshill) GB106039017930: Hale/Mill Bourne (Bagshot to Addlestone Bourne confluence near Chobham) GB106039017180: Blackwater (Aldershot to Cove Brook confluence at Hawley) GB106039017850: Clasford Brook and Wood Street Brook GB106039017820: Wey (Tilford to Shalford) GB106039017630: Wey (Shalford to River Thames confluence at Weybridge) GB40602G601800: Effingham Tertiaries (GW)
Number of waterbodies requiring further WFD assessment	3
Waterbodies requiring further WFD assessment	GB40602G601300:Farnborough Bagshot Beds (GW) GB40602G601400:Chobham Bagshot Beds (GW) GB70610019:Basingstoke Canal

2.2.13 Kempton - 150 – Construction

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.13: WFD Level 1 assessment outcomes for Kempton - 150 - Construction

Kempton - 150 - Construction	
Option ID	TWU_LON_HI-ROC_WT1_CNO_kemptonwtw150
Option Description	Treatment to drinking water standards of 150 Ml/d of raw water from the West London reservoirs.
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB106039023451: Portlane Brook GB40603G000300: Lower Thames Gravels
Number of waterbodies requiring further WFD assessment	0

2.2.14 Moulsford 1

The Level 1 WFD assessment covered three water bodies for this option. The outcomes indicated further assessment would be necessary for three waterbodies: GB106039030331: Thames Wallingford to Caversham river water body, GB40601G600900: Berkshire Downs Chalk groundwater body and GB40601G601400: Chilterns Chalk Scarp groundwater body.

Table 2.14: WFD Level 1 assessment outcomes for Moulsford 1

Moulsford 1	
Option ID	TWU_SWX_HI-GRW_ALL_ALL_moulsford gw
Option Description	Construction of an abstraction borehole in the unconfined Chalk north of Streatley on the west bank of the River Thames. Water abstracted from the borehole will be treated at the existing Cleeve water treatment works (WTW) located on the eastern side of the River Thames.
Number of waterbodies passing WFD assessment	0
Waterbodies passing WFD assessment	-
Number of waterbodies requiring further WFD assessment	3
Waterbodies requiring further WFD assessment	GB106039030331: Thames Wallingford to Caversham GB40601G600900: Berkshire Downs Chalk GB40601G601400: Chilterns Chalk Scarp

2.2.15 SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)

The Level 1 WFD assessment covered 18 waterbodies for this option. The outcomes indicated further assessment would be necessary for five waterbodies: GB106039030210: Filchhampstead Brook at Farmoor, GB106039029780: Bayswater Brook, GB106039030180: Northfield Brook (Source to Thames) at Sandford and GB106039030240: Thame (Scotsgrove Brook to Thames) and GB40602G600700: Headington Corallian river water bodies.

Table 2.15: WFD Level 1 assessment outcomes for SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)

SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)	
Option ID	TWU_SWA_HI-TFR_SWX_ALL_swoxswa48
Option Description	Abingdon WTW to Long Crendon to supply SWA
Number of waterbodies passing WFD assessment	13

SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)	
Waterbodies passing WFD assessment	GB106039023360: Cow Common Brook and Portobello Ditch GB106039023430: Ock and tributaries (Land Brook confluence to Thames) GB106039023410: Sandford Brook (source to Ock) GB106039023420: Frilford and Marcham Brook GB106039030333: Thames (Leach to Evenlode) GB106039030334: Thames (Evenlode to Thame) GB106039029880: Evenlode (Glyme to Thames) GB106039029800: Cherwell (Ray to Thames) and Woodeaton Broo GB106039030360: Holton Brook and tributaries GB106039030340: Worminghall Brook and tributaries GB106039030290: Peppershill and Shabbington Brooks GB106039030400: Dorton, Chearsley and Waddesdon Brooks GB40602G600600; Shrivenham Corallian
Number of waterbodies requiring further WFD assessment	5
Waterbodies requiring further WFD assessment	GB106039030210: Filchhampstead Brook at Farmoor GB106039029780: Bayswater Brook GB106039030180: Northfield Brook (Source to Thames) at Sandford GB106039030240: Thame (Scotsgrove Brook to Thames) GB40602G600700: Headington Corallian

2.2.16 Thames Water (SWA) to Thames Water (SWOX) Conveyance

This option makes use of existing assets and continues a current option. Therefore, no WFD assessment is required.

2.2.17 River Thames to Fobney Transfer

The Level 1 WFD assessment covered four waterbodies for this option. The outcomes indicated further assessment would be necessary for two waterbodies: GB106039030331: Thames Wallingford to Caversham river water body and GB40601G600900: Berkshire Downs Chalk groundwater body.

Table 2.16: WFD Level 1 assessment outcomes for River Thames to Fobney Transfer

River Thames to Fobney Transfer	
Option ID	TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney
Option Description	
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB106039023141: Holy Brook GB106039023140: Kennet and Holy Brook
Number of waterbodies requiring further WFD assessment	2
Waterbodies requiring further WFD assessment	GB106039030331: Thames Wallingford to Caversham GB40601G600900: Berkshire Downs Chalk (GW)

2.2.18 Abingdon to Farmoor Reservoir Pipeline

The Level 1 WFD assessment covered nine waterbodies for this option. The outcomes indicated further assessment would be necessary for one waterbody: GB106039030334: Thames (Evenlode to Thame) river water body.

Table 2.17: WFD Level 1 assessment outcomes for Abingdon to Farmoor Reservoir Pipeline

Abingdon to Farmoor Reservoir Pipeline	
Option ID	TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe
Option Description	Construction of a transfer pipeline to convey 24 Ml/d of raw water between a proposed reservoir at Abingdon and the existing Farmoor reservoir, in the SWOX WRZ. (Note: Abingdon reservoir creation is not part of this option). The engineering scope includes the provision of a booster pump station at the proposed Abingdon Reservoir site to facilitate the transfer. Treatment would be provided at the existing WTW.
Number of waterbodies passing WFD assessment	8
Waterbodies passing WFD assessment	GB106039023430: Ock and tributaries (Land Brook confluence to Thames) GB106039023360: Cow Common Brook and Portobello Ditch GB106039023410: Sandford Brook (source to Ock) GB106039023420: Frilford and Marcham Brook GB106039030333: Thames (Leach to Evenlode) GB106039030210: Filchhampstead Brook at Farmoor GB30641011: Farmoor Reservoir GB40602G600600: Shrivenham Corallian
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB106039030334: Thames (Evenlode to Thame)

2.2.19 Dapdune Licence Disaggregation

The Level 1 WFD assessment covered two waterbodies for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.18: WFD Level 1 assessment outcomes for Dapdune Licence Disaggregation

Dapdune Licence Disaggregation	
Option ID	TWU_GUI_HI-GRW_ALL_ALL_dapdune lic disagg
Option Description	Licence disaggregation. DO benefit 0 Ml/d average, 2.2 Ml/d peak
Number of waterbodies passing WFD assessment	2
Waterbodies passing WFD assessment	GB106039017630: Wey (Shalford to River Thames confluence at Weybridge) GB40601G604300: Guildford Chalk
Number of waterbodies requiring further WFD assessment	0

2.2.20 Mortimer Disused Source (Recommission)

The Level 1 WFD assessment covered one waterbody for this option. The outcomes indicated no further assessment would be necessary for the option because the types of activities do not present a risk to WFD status or objectives for any waterbodies.

Table 2.19: WFD Level 1 assessment outcomes for Mortimer Disused Source (Recommission)

Mortimer Disused Source (Recommission)	
Option ID	TWU_KVZ_HI-GRW_ALL_ALL_mortimer recomm
Option Description	Refurbishment of two disused abstraction boreholes located on-site at the existing, but disused Mortimer water treatment works (WTW). Water abstracted from the boreholes will be treated at the disused WTW which will be upgraded for ammonia and iron removal and recommissioned. DO benefit 4.5 Ml/d average and peak
Number of waterbodies passing WFD assessment	1
Waterbodies passing WFD assessment	GB106039017380: Foudry Brook (West End Brook to M4)
Number of waterbodies requiring further WFD assessment	0

2.2.21 Post-2050 Option: Merton Recommission

The Level 1 WFD assessment covered one waterbody for this post-2050 option. The outcomes indicated further assessment would be necessary for one waterbody: GB106039023460: Wandle (Croydon to Wandsworth) and the Graveney river waterbody.

As outlined in Section 1.2, post-2050 options are not taken forward for further assessment or inclusion in the cumulative effects assessment at this stage due to the uncertainties regarding future environment for these options.

Table 2.20: WFD Level 1 assessment outcomes for Merton Recommission

Merton Recommission	
Option ID	TWU_LON_HI-GRW_ALL_ALL_merton recommission
Option Description	The option comprises the recommissioning and upgrade of the Merton Abbey WTW in order to treat the maximum peak DO of 8Ml/d from the Merton Abbey Well.
Number of waterbodies passing WFD assessment	0
Waterbodies passing WFD assessment	-
Number of waterbodies requiring further WFD assessment	1
Waterbodies requiring further WFD assessment	GB106039023460: Wandle (Croydon to Wandsworth) and the Graveney;

2.3 Summary of SRO option WFD ACWG Level 1 outputs

2.3.1 T2ST

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[2], but a summary of is provided in this report for completeness.

The WFD ACWG Level 1 assessment covered 24 water bodies for this option. The outcomes indicated further assessment would be necessary for eight waterbodies: GB106039030334: Thames (Evenlode to Thame) river water body, GB106039023220: Lambourn (Source to Newbury) river water body, GB106039023174: Middle Kennet (Hungerford to Newbury) river water body, GB10704022710: Test (Upper) river water body, GB107042022700: Test – Bourne Rivulet to conf Dever river water body, GB107042022770: Dever river water body,

[2] Mott MacDonald (2022) Thames to Southern Transfer Water Framework Directive Regulations Compliance Assessment Report

GB40601G600900: Berkshire Downs Chalk groundwater body and GB40701G501200: River Test Chalk groundwater body.

Table 2.21: WFD ACWG Level 1 assessment outcomes for T2ST

T2ST	
Option Description	T2ST: Transfer from the River Thames to the South
Number of waterbodies passing WFD assessment	16
Waterbodies passing WFD assessment	GB106039023360: Cow Common Brook and Portobello Ditch GB106039023660: Ginge Brook and Mill Brook GB106039023600: Mill Brook and Bradfords Brook system, Wallingford GB106039023300: Pang GB106039023210: Winterbourne GB106039017280: Enborne (Source to downstream A34) GB106039017210: Penwood Stream GB106039017310: Enborne (downstream A34 to Burghclere Brook) GB106039017230: Earlstone Stream and Burghclere Brook (source to Enborne) GB107042022740: Sombourne Stream GB107042022730: Nun's Walk Stream GB107042016310: Monks Brook GB107042022580: Itchen GB40601G601000: Vale of White Horse Chalk GB40602G601600: Thatcham Tertiaries GB40701G505000: River Itchen Chalk.
Number of waterbodies requiring further WFD assessment	8
Waterbodies requiring further WFD assessment	GB106039030334: Thames (Evenlode to Thame) GB106039023220: Lambourn (Source to Newbury) GB106039023174: Middle Kennet (Hungerford to Newbury) GB107042022710: Test (Upper) GB107042022700: Test - Bourne Rivulet to conf Dever GB107042022770: Dever GB40601G600900: Berkshire Downs Chalk GB40701G501200: River Test Chalk.

2.3.2 SESRO

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[3], but a summary of is provided in this report for completeness.

The WFD ACWG Level 1 assessment covered 12 water bodies for this option. The outcomes indicated further assessment would be necessary for five water bodies: GB106039023430: Ock and tributaries (Land Brook confluence to Thames); GB106039023360: Cow Common Brook and Portobello Ditch, GB106039023380: Childrey Brook and Norbrook at Common Barn, GB106039023410: Sandford Brook (source to Ock) and GB106039030334: Thames (Evenlode to Thame) river waterbodies.

Groundwater bodies were reviewed as part of the screening assessment. Two groundwater bodies exist close to the site, namely 1) Shrivenham Corallian (GB40602G60060) which is located north of the footprint (boundary around Marcham and Shippon) and 2) Vale of White Horse Chalk (GB40601G601000) which is located south of the footprint (boundary south of the

[3] Atkins (2022) South East Strategic Reservoir Option Water Framework Directive Regulations Compliance Assessment report

railway line which goes east to west from Didcot Parkway to Swindon). However, no groundwater body is located within the indicative location of SESRO within the immediate underlying deposits and hence groundwater bodies have been screened out from further assessment. Any extension of the indicative location of SESRO to include the areas of the floodplain around the length impacted by any changes to flow in Childrey Brook would not require the screening of any of the neighbouring groundwater bodies back into the assessment. Further assessment with respect to localised changes in the hyporheic zone would be undertaken during subsequent project stages to assess impacts around watercourse diversions and any Groundwater Dependent Terrestrial Ecosystems (GWDTE).

Table 2.22: WFD ACWG Level 1 assessment outcomes for SESRO

SESRO	
Option Description	SESRO: South east strategic reservoir option. New storage reservoir in the south east of England.
Number of waterbodies passing WFD assessment	7
Waterbodies passing WFD assessment	GB106039030331: Thames Wallingford to Caversham GB106039023233: Thames (Reading to Cookham) GB106039023231: Thames (Cookham to Egham) GB106039023232: Thames (Egham to Teddington) GB106039023660: Ginge Brook and Mill Brook GB40602G60060: Shrivenham Corallian GB40601G601000: Vale of White House Chalk.
Number of waterbodies requiring further WFD assessment	5
Waterbodies requiring further WFD assessment	GB106039023430: Ock and tributaries (Land Brook confluence to Thames) GB106039023360: Cow Common Brook and Portobello Ditch GB106039023380: Childrey Brook and Norbrook at Common Barn GB106039023410: Sandford Brook (source to Ock) GB106039030334: Thames (Evenlode to Thame)

2.3.3 STT

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[4], but a summary of is provided in this report for completeness.

The WFD ACWG Level 1 assessment covered 22 waterbodies for this option. The outcomes indicated that all waterbodies would require further assessment (see table below). Where the associated evidence and assessment reports have identified an impact to a WFD status element with no published targets in the draft RBMP3, this impact has still been considered within the Level 2 assessment. This is to ensure a holistic understanding of the potential impacts of the scheme is maintained throughout the assessment. When this is the case, a note stating ‘No Classification in RBMP3’ within the waterbody-specific tabs has been provided.

Table 2.23: WFD ACWG Level 1 assessment outcomes for STT

STT – full scheme	
Option Description	STT: Transfer from River Severn (support by additional discharges from Vyrnwy reservoir) to River Thames.
Number of waterbodies passing WFD assessment	0

[4] United Utilities on behalf of the STT group(2022) Severn Thames Transfer Solution Water Framework Directive Regulations Compliance Assessment Report

STT – full scheme	
Waterbodies passing WFD assessment	-
Number of waterbodies requiring further WFD assessment	22
Waterbodies requiring further WFD assessment	GB109054049880: Vrynwy - Lake Vrynwy to conf Afon Cownwy GB109054049720: Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy GB109054049852: Afon Vyrnwy DS of Banwy confluence GB109054049800: Afon Vyrnwy - conf Afon Tanat to conf R Severn GB109054049142: Severn - conf Bele Bk to conf Sundorne Bk GB109054049141: Severn - Sundorne Bk to conf M Wenlock-Farley Bk GB109054049143: Severn conf M Wenlock-Farley Bk to conf R Worfe GB109054049145: Severn - conf R Worfe to conf R Stour GB109054049144: Severn - conf R Stour to conf River Teme GB109054039760: Severn - conf R Teme to conf R Avon GB109054044404: Severn - conf R Avon to conf Upper Parting GB109054043840: Avon (Warks) - conf R Sowe to conf R Leam GB109054044402: Avon (Wark) conf R Leam to Tramway Br, Stratford GB109054044401: Avon- Tramway Br Stratford to Workman Br Evesham GB109054044403: Avon conf Workman Br, Evesham to conf R Severn GB106039030334: Thames (Evenlode to Thame) GB106039030331: Thames Wallingford to Caversham GB106039023233: Thames (Reading to Cookham) GB106039023231: Thames (Cookham to Egham) GB106039023232: Thames (Egham to Teddington) GB109054032750: Severn (E Channel) - Horsebere Bk to Severn Est GB530905415403: SEVERN UPPER

2.3.4 London Reuse: Teddington DRA scheme (75Ml/d)

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[5], but a summary of is provided in this report for completeness.

The Level 1 WFD assessment covered five waterbodies for this option. The outcomes indicated further assessment would be necessary for two waterbodies: GB106039023232: Thames (Egham to Teddington) river water body and GB530603911403: Thames Upper transitional water body.

[5] Ricardo (2022), London Effluent Refuse SRO Gate 2 Water Framework Directive Regulations Report

Table 2.24: WFD Level 1 assessment outcomes for Teddington DRA

Teddington DRA	
Option Description	London Reuse: Teddington DRA
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB106039023030: Crane GB806100095: Lower Duke of Northumberland's River GB30641865: Lockwood Reservoir
Number of waterbodies requiring further WFD assessment	2
Waterbodies requiring further WFD assessment	GB106039023232: Thames (Egham to Teddington) GB530603911403: THAMES UPPER;

2.4 Summary of Drought plan WFD assessments

2.4.1 Gatehampton - Swindon Oxford (SWOX)

The WFD assessment for the Gatehampton drought plan (DP) option assesses potential impacts on the Thames Wallingford to Caversham (GB106039030331) river waterbody and the Chiltern Chalk Scarp (GB40601G604100) groundwater body.

The screening WFD assessment on the river water body carried out in the drought plan finds that no further assessment of WFD river water body is required due to a negligible impact on hydrology and biology being classed as not sensitive to potential changes. The groundwater body is also screened out as all groundwater bodies are considered to be extremely unlikely to sensitive to the changes caused by drought plan options.

2.4.2 Playhatch - Kennet Valley

The WFD assessment for the Playhatch drought plan (DP) option assesses potential impacts on the Thames (Reading to Cookham) (GB106039023233) and Thames Wallingford to Caversham (GB106039030331) river waterbodies and the South West Chilterns Chalk (GB40601G601100) groundwater body.

The screening WFD assessment carried out in the drought plan finds that no further assessment of either WFD river water bodies status is required due to negligible impacts on hydrology and biology being classed as not sensitive to potential changes. The groundwater body is also screened out as all groundwater bodies are considered to be extremely unlikely to sensitive to the changes caused by drought plan options.

3 Water Framework Directive ACWG Level 2 assessments

The second stage of WFD assessment has been completed for WRMP24 options that were screened in at Level 1. Further information on WFD classification and the approach adopted can be found in *ACWG, WFD: Consistent framework for undertaking no deterioration assessments, Nov 2020*.

Section 3.1 provides an overview of the Level 2 WFD assessments findings while Section 3.2 provides summary tables for each Level 2 assessment, going into more depth with mitigation measures and scoring.

3.1 Summary of WFD ACWG Level 2 outcomes

3.1.1 Britwell Removal of Constraints

One water body was identified as requiring further assessment: Chiltern Chalk Scarp groundwater body.

The Level 2 WFD assessment identified potential risk of deterioration to the quantitative dependent surface water status due to the increased groundwater abstraction lowering for groundwater levels and therefore reducing baseflow to the local surface watercourses. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. Thames Water will continue to review this option as this plan is finalised.

The ‘reasons for not achieving good’ (RNAG) for this chalk groundwater body relate to:

- Chemical Drinking Water Protected Area test status, General Chemical test status and trend assessment due to ‘pollution from towns, cities and transport’; and
- Chemical Drinking Water Protected Area test status, General Chemical test status and trend assessment due to ‘pollution from rural areas’.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status.

A summary of the Level 2 WFD assessment is included in Table 3.1, detailed outputs are presented in Annex B.

3.1.2 ASR Horton Kirby

One water body was identified as requiring further assessment: West Kent Darent and Cray Chalk groundwater body.

The Level 2 WFD assessment identified potential risk of deterioration risks to the quantitative dependent surface water body status as a result of the increased groundwater being abstracted from the existing on site Chalk boreholes during wetter periods, to supply water to be injected into the ASR borehole. Impact of additional abstraction from Chalk could lead to reduction in surface water flows. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. Thames Water will continue to review this option as this plan is finalised.

The RNAG for this chalk groundwater body relate to:

- Chemical Drinking Water Protected Area test status, General Chemical test status and trend assessment due to ‘pollution from towns, cities and transport’;
- Chemical Drinking Water Protected Area test status, General Chemical test status and trend assessment due to ‘pollution from rural areas’; and
- Quantitative dependent Surface Water body status and Quantitative Water Balance due to changes in natural flow and levels of water.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to ‘pollution from towns, cities and transport’ or ‘pollution from rural areas’. However, this option includes for additional abstraction from the existing Chalk borehole (during non-drought periods). The additional abstraction could lead to further ‘changes in natural flow and levels of water’, and a reduction in improvements which could be made. Further assessment is required to investigate the potential for this option to limit the achievement of good status on the Quantitative dependent Surface Water body test and Quantitative Water Balance test.

A summary of the Level 2 WFD assessment is included in Table 3.2, detailed outputs are presented in Annex B.

3.1.3 Datchet Increase DO

One water body was identified as requiring further assessment: Lower Thames Gravels groundwater body.

The Level 2 WFD assessment identified potential risk of deterioration to the quantitative dependent surface water and water balance status due to the increased groundwater abstraction lowering for groundwater levels and therefore potentially reducing baseflow to the local surface watercourses and changing water balance. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. Thames Water will continue to review this option as this plan is finalised.

The RNAG for this chalk waterbody relate to trend assessment due to ‘pollution from waste water’. Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to ‘pollution from waste water’.

A summary of the Level 2 WFD assessment is included in Table 3.3, detailed outputs are presented in Annex B.

3.1.4 Southfleet/Greenhithe (new WTW)

Two water bodies were identified as requiring further assessment: North Kent Medway Chalk and West Kent Darent and Cray Chalk groundwater bodies.

The Level 2 WFD assessment for both water bodies identified potential risk of deterioration to the quantitative dependent surface water and water balance status due to the increased groundwater abstraction lowering for groundwater levels and therefore potentially reducing baseflow to the local surface watercourses and changing water balance. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. Thames Water will continue to review this option as this plan is finalised.

The RNAG for both the North Kent Medway Chalk and the West Kent Darent and Cray Chalk groundwater body relate to:

- Chemical Drinking Water Protected Area test status, General Chemical test status and trend assessment due to ‘pollution from towns, cities and transport’;

- Chemical Drinking Water Protected Area test status, General Chemical test status and trend assessment due to ‘pollution from rural areas’; and
- Quantitative dependent Surface Water body status and Quantitative Water Balance due to changes in natural flow and levels of water.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to ‘pollution from towns, cities and transport’ or ‘pollution from rural areas’ in either water body. However, this option includes an increase in groundwater abstraction which will affect groundwater levels in both water bodies. The additional abstraction could lead to further ‘changes in natural flow and levels of water’, and a reduction in improvements which could be made. Further assessment is required to investigate the potential for this option to limit the achievement of good status on the Quantitative dependent Surface Water body test and Quantitative Water Balance test, in both waterbodies.

A summary of the Level 2 WFD assessment is included in Table 3.4, detailed outputs are presented in Annex B.

3.1.5 Groundwater Addington

One water body was identified as requiring further assessment: Epsom North Downs Chalk groundwater body.

The Level 2 WFD assessment identified potential risk of deterioration to the quantitative dependent surface water and water balance status due to the increased groundwater abstraction lowering for groundwater levels and therefore potentially reducing baseflow to the local surface watercourses and changing water balance. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. Thames Water will continue to review this option as this plan is finalised.

The RNAG for this chalk groundwater body relate to:

- Trend assessment due to ‘pollution from towns, cities and transport’;
- Trend assessment due to ‘pollution from rural areas’; and
- Quantitative dependent Surface Water body status due to ‘changes in natural flow and levels of water’.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to ‘pollution from towns, cities and transport’ or ‘pollution from rural areas’. However, this option includes for an increase in abstraction from a new Chalk borehole. The additional abstraction could lead to further ‘changes in natural flow and levels of water’, and a reduction in improvements which could be made. Further assessment is required to investigate the potential for this option to limit the achievement of good status on the Quantitative dependent Surface Water body test.

A summary of the Level 2 WFD assessment is included in Table 3.5, detailed outputs are presented in Annex B.

3.1.6 Woods Farm Increase DO

One water body was identified as requiring further assessment: Berkshire Downs Chalk groundwater body.

The Level 2 WFD assessment identified minor localised risks to the biological quality elements, hydrological supporting elements and physico-chemical quality elements and quantitative status elements. This is primarily due to the increase in groundwater abstraction, and are not considered to lead to a risk of deterioration at the waterbody scale.

The RNAG for this chalk groundwater body relate to:

- Trend assessment due to ‘pollution from towns, cities and transport’;
- Chemical drinking water protected area, General chemical test and Trend assessment due to ‘pollution from rural areas’; and
- Quantitative dependent Surface Water body status due to ‘changes in natural flow and levels of water’.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to ‘pollution from towns, cities and transport’ or ‘pollution from rural areas’. This option includes for an increase in abstraction from an existing Chalk borehole (within licence but above recent actual). The additional abstraction could lead to minor ‘changes in natural flow and levels of water’, and a minor risk of a reduction in improvements which could be made. Further assessment is required to investigate whether this option will limit the achievement of good status on the Quantitative dependent Surface Water body test.

A summary of the Level 2 WFD assessment is included in Table 3.6, detailed outputs are presented in Annex B.

3.1.7 South East Water to Guildford

Three water bodies were identified as requiring further assessment: Farnborough Bagshot Beds, Chobham Bagshot Beds groundwater bodies and Basingstoke Canal water body.

The Level 2 WFD assessment for the Basingstoke Canal identified potential deterioration of the physico-chemical quality elements due to potential construction impacts from below ground works on the canal which is also a SSSI and GWDTE. This is primarily due to the increased in groundwater abstraction. The Level 2 WFD assessment for the groundwater bodies identified minor localised impacts from below ground construction activities. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required.

Both of the groundwater bodies are currently at good status and therefore have no RNAG. The Basingstoke Canal water body has one RNAG on the Mitigation measures assessment element, due to physical modifications for recreation. This option is not anticipated to impact on the potential to achieve good status due to physical modifications as no modifications to the canal are proposed.

A summary of the Level 2 WFD assessment is included in Table 3.7, detailed outputs are presented in Annex B.

3.1.8 Moulsford 1

Three water bodies were identified as requiring further assessment: Thames Wallingford to Caversham river water body, Berkshire Downs Chalk and Chilterns Chalk Scarp groundwater bodies.

The Level 2 WFD assessment identified minor localised risks to the biological quality elements, hydrological supporting elements and physico-chemical quality elements and quantitative status elements. This is primarily due to the increase in groundwater abstraction and are not considered to lead to a risk of deterioration at the waterbody scale.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in the Chilterns Chalk Scarp groundwater body or Thames Wallingford to Caversham river water body.

The RNAG for the Berkshire Downs Chalk groundwater body relate to:

- Trend assessment due to ‘pollution from towns, cities and transport’;
- Chemical drinking water protected area, General chemical test and Trend assessment due to ‘pollution from rural areas’; and
- Quantitative dependent Surface Water body status and Quantitative water balance status due to ‘changes in natural flow and levels of water’.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to ‘pollution from towns, cities and transport’ or ‘pollution from rural areas’. This option includes for an increase in abstraction from a Chalk borehole. The additional abstraction could lead to ‘changes in natural flow and levels of water’ in the nearby River Thames and water levels in the aquifer. The water abstracted will be used to supply customers up-catchment from the abstraction and therefore water is expected to be returned to the River Thames in upstream STW discharges. A minor risk of a reduction in improvements which could be made is highlighted. Further assessment is required to investigate whether this option will limit the achievement of good status on the water balance test.

A summary of the Level 2 WFD assessment is included in Table 3.8, detailed outputs are presented in Annex B.

3.1.9 SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)

Five water bodies have been identified as requiring further assessment: Filchhampstead Brook at Farmoor, Bayswater Brook, Northfield Brook (Source to Thames) at Sandford and Thame (Scotsgrove Brook to Thames) river water bodies and GB40602G600700: Headington Corallian groundwater body.

The Level 2 WFD assessments for the five water bodies identified minor impacts on the biological quality elements, hydrological supporting elements and physico-chemical quality elements. This is primarily due to the potential dewatering as a result of below ground structures. Minor localised impacts were also identified for surface water dependent status elements and GWDTE status elements in the groundwater body due to temporary construction impacts. These impacts are not considered to lead to a risk of deterioration at the waterbody scale.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in any of the five water bodies.

A summary of the Level 2 WFD assessment is included in Table 3.9, detailed outputs are presented in Annex B.

3.1.10 River Thames to Fobney Transfer

Two water bodies were identified as requiring further assessment: Thames Wallingford to Caversham river water body and Berkshire Downs Chalk groundwater body.

The Level 2 WFD assessment for Thames Wallingford to Caversham identified deterioration risks to the biological quality elements, hydrological supporting elements and physico-chemical quality elements. This is primarily due to the increased surface water abstraction. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. This option is still under development and Thames Water will continue to review this option as this plan is finalised.

The groundwater body Level 2 WFD assessment identified minor localised impacts on surface water dependent status element and water balance, due to construction of below ground works.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status in the Berkshire Downs Chalk groundwater body and are not considered to lead to a risk of deterioration at the waterbody scale.

The RNAG for the Thames Wallingford to Caversham river water body relate to:

- Mitigation measures assessment due to 'physical modifications.
- Phosphate due to 'Pollution from waste water' and 'pollution from rural areas'. Two RBMP Programme of measures are in place to address these water quality issues; and
- Invertebrates due to non-native invasive species.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status due to 'Pollution from waste water', 'pollution from rural areas' or 'non-native invasive species'. However, this option does include new modifications (new intake structure) which could impact on the improvements which could be made. Further assessment is required to investigate whether this option will limit the achievement of good status on the mitigation measures assessment.

A summary of the Level 2 WFD assessment is included in Table 3.10, detailed outputs are presented in Annex B.

3.1.11 Abingdon to Farmoor Reservoir Pipeline

One water body was identified as requiring further assessment: Thames Wallingford to Caversham river water body

The Level 2 WFD assessment identified a risk of deterioration to the biological quality elements, hydromorphological supporting elements and physico-chemicals. This is primarily due to a potential risk of new / increased surface water abstractions and new intake structure. Further assessment is required to investigate the potential for deterioration in this waterbody, and to identify mitigation, if required. Thames Water will continue to review this option as this plan is finalised.

The RNAG for this river water body relate to:

- Phosphate due to Trend assessment due to 'pollution from waste water' and 'pollution from rural areas'; and
- Tributyltin Compounds due to 'pollution from waste water'.

Due to the nature of the works this option is not anticipated to impact on the potential to achieve good status.

A summary of the Level 2 WFD assessment is included in Table 3.11. detailed outputs are presented in Annex B.

3.2 Summary of SRO option WFD ACWG Level 2 outputs

3.2.1 T2ST

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[6], but a summary of is provided in this report for completeness.

Eight water bodies were identified as requiring further assessment: Thames (Evenlode to Thame) river water body, Lambourn (Source to Newbury) river water body, Middle Kennet

[6] Mott MacDonald (2022) Thames to Southern Transfer Water Framework Directive Regulations Compliance Assessment Report

(Hungerford to Newbury), Test (Upper), Test - Bourne Rivulet to conf Dever, Dever river water bodies, Berkshire Downs Chalk and River Test Chalk groundwater bodies.

The Level 2 WFD assessment for the Thames (Evenlode to Thame) water body identified negligible impact of abstraction from the river during high flow periods. Modelling also showed that there would be negligible impact on water quality in the reservoir and in the River Thames as a result of the support of the T2ST scheme.

For the five river water bodies: Lambourn (Source to Newbury), Middle Kennet (Hungerford to Newbury), Test (Upper) and Test – Bourne Rivulet to conf Dever and Dever the Level 2 assessment identified minor localised effects due to construction of watercourse crossings and crossings of the flood plains.

For the River Test Chalk groundwater body the Level 2 WFD assessment identified potential risk of deterioration due to the proximity of construction to GWDTEs, which could impact on groundwater levels and impact the site. Minor localised impacts were identified for the Berkshire Downs Chalk waterbody for the same reason.

This option is still under development and Thames Water will continue to review this option as this plan is finalised.

A summary of the Level 2 WFD assessment is included in Table 3.12. Detailed outputs are presented in Annex B.

3.2.2 SESRO

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[7], but a summary of is provided in this report for completeness.

The WFD ACWG Level 2 assessments undertaken in the Gate 2 process have identified those water bodies that need to be screened into future assessment phases of work on SESRO. Five water bodies were screened in and a further four on the River Thames have been pulled through to further assessment at subsequent project stages as impacts cannot be ruled out at this stage. These are:

- Childrey Brook and Norbrook at Common Barn - GB106039023380;
- Sandford Brook (source to Ock) - GB106039023410;
- Cow Common Brook and Portobello Ditch - GB106039023360;
- Ock and tributaries (Land Brook confluence to Thames) - GB106039023430; and
- Thames (Evenlode to Thames) - GB106039030334.

The following WFD water bodies were screened out of the WFD ACWG Level 2 assessment, however, until further assessments into the hydrological impacts on the River Thames are completed, they cannot be fully discounted and so will be assessed again at Gate 3:

- Thames Wallingford to Caversham - GB106039030331;
- Thames (Reading to Cookham) - GB106039023233;
- Thames (Cookham to Egham) - GB106039023231; and
- Thames (Egham to Teddington) - GB106039023232.

The ACWG Level 2 assessment concluded that with the proposed mitigation all River Ock and River Thames WFD water bodies are compliant and therefore should not require WFD derogations. The details of further environmental mitigation, that will be completed in later stages of the project, will help to confirm these assessments and give more detail on the level of

[7] Atkins (2022) South East Strategic Reservoir Option Water Framework Directive Regulations Compliance Assessment report

impact. This is especially the case in relation to change of volumes of flow and water quality from the diverted watercourses within the River Ock catchment, and their possible effects on the Cow Common Brook and Portobello Ditch, Childrey Brook and Norbrook at Common Barn, and Ock and tributaries (Land Brook confluence to Thames) WFD waterbodies. The current assessment suggests that there will be benefits to aquatic communities as a result of improvements to aquatic habitats. There could also be a reduction in flows as a result of a change in flow routing and impingement of catchments by the reservoir. This may also locally change water quality, but this is subject to further modelling and assessment work.

A summary of the Level 2 WFD assessment is included in Table 3.13 detailed outputs are presented in Annex B.

3.2.3 STT

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[8], but a summary of is provided in this report for completeness.

There is potential for introducing impediments to target status in four waterbodies in the River Avon from Stoneleigh to the confluence with the River Severn reach. The impediments are associated with the 115Ml/d advanced treated effluent transfer from Minworth WwTW. The waterbodies in this reach at risk of status deterioration and impediments are:

- Avon (Warks) -conf R Sowe to conf R Leam GB109054043840;
- Avon (Wark) conf R Leam to Tramway Br, Stratford -GB109054044402;
- Avon-Tramway Br Stratford to Workman Br Evesham -GB109054044401 and
- Avon conf Workman Br, Evesham to conf R Severn-GB109054044403.

The SRO WFD[4] assessment states that in line with the evidence and assessment reports, non-compliance issues relate to specific pollutants/ chemical status (Objective 2 introducing impediments). The effects associated with the 115Ml/d advanced treated effluent transfer may be mitigated to compliant through further development of operating rules. There is potential for introducing impediments to target status in one waterbody in the River Severn from the confluence with the River Avon to Deerhurst reach. The impediments are associated with the pass forward effects from the 115Ml/d Minworth Transfer during the Full STT. The waterbody at risk of non-compliance in these reaches is Severn -conf R Avon to conf Upper Parting - GB109054044404.

The SRO WFD[4] assessment states that in line with the evidence and assessment reports, non-compliance is associated with Specific pollutants/ chemical status. As above, the effects associated with the 115Ml/d advanced treated effluent transfer may be mitigated to compliant through further development of operating rules. The effects on the River Severn reaches upstream of the River Avon confluence (River Severn from the Vyrnwy Bypass Outfall to Bewdley, and the River Severn from Bewdley to the confluence with the River Avon), along with tidal reaches, are deemed to be WFD compliant. In these reaches, there is no pathway of environmental water quality change, and potential changes in velocity and depth are not considered to be of a magnitude to result in impacts on aquatic ecology or morphology. In the c.140 km of the River Thames from Culham to the tidal limit at Teddington, modelled water quality predicts a benefit to a small benefit to dissolved oxygen saturation, and a small benefit to PFOS and the polyaromatic hydrocarbon benzo(g,h,i)perylene. Although, any betterment from STT Solution would not lead to EQS being achieved in the River Thames for these chemicals.

[8] United Utilities on behalf of the STT group(2022) Severn Thames Transfer Solution Water Framework Directive Regulations Compliance Assessment Report

A summary of the Level 2 WFD assessment is included in Table 3.14. detailed outputs are presented in Annex B.

3.2.4 London Reuse: Teddington DRA 75Ml/d

This option is one of the Strategic resource options (SRO). These have been assessed under the individual SRO project[9], but a summary of is provided in this report for completeness.

An assessment has been undertaken of the WFD compliance of a Teddington DRA scheme sized at 75 Ml/d.

Two water bodies were identified as requiring further assessment: Thames (Egham to Teddington) river water body and Thames Upper transitional water body.

The Level 2 WFD assessment for the Thames (Egham to Teddington) water body (GB106039023232) showed that there is a potential for moderate reductions (17%) in exceptionally low flows for 250m between the intake and outfall. However, no potential for status deterioration or introducing impediments to target status were identified in the Thames (Egham to Teddington). Minor changes to physico-chemical water quality were noted. Impacts on aquatic ecology and fish are expected to be negligible.

No potential for status deterioration or introducing impediments to target status were identified in the Thames Upper (GB530603911403) water body. This assessment has been supported by bespoke modelled and measured data on pathways of impact and have a medium to high confidence.

If a Teddington DRA scheme is selected for continuation, the recommendations for further evidence collection set out in the assessment reports to reduce uncertainties and include:

- Continued spot water quality monitoring for WFD chemical and continuous physico-chemical water quality monitoring in the Mogden STW final effluent and River Thames at Teddington.
- Continued use of eDNA in the lower River Thames to resolve evidence of presence of sea lamprey and potentially river lamprey in order to support further assessment.
- Continued invertebrate and phytoplankton surveys in Thames Tideway in order to support further assessment.

A summary of the Level 2 WFD assessment is included in table 3.15 detailed outputs are presented in Annex B.

3.3 Best Value Plan Options Level 2 summary tables

Summary tables of the Level 2 WFD outcomes are provided below and detailed outputs are presented in Annex B.

[9] Ricardo (2022), London Effluent Refuse SRO Gate 2 Water Framework Directive Regulations Report

Table 3.1: Britwell Removal of Constraints Level 2 WFD summary

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40601G604100	Chiltern Chalk Scarp	Low / Low	2	Assess extent of impact due to new abstraction and establish if this option will negatively impact GW flow and levels, as well as associated SW flow. Further assessments will improve confidence in option.	Option includes for the installation of observation boreholes and a low flow investigation to understand the implications of the abstraction. Study needed to understand if mitigation needed.	Possible	No	No	No

Table 3.2: ASR Horton Kirby Level 2 WFD summary

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40601G501800	West Kent Darent and Cray Chalk	Low / Low	2	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Update to WFD baseline data to include 2019 status (update to cycle 3). Further information about option, including details on abstraction conditions.	Use of HOF for abstraction from Chalk to recharge ASR well.	Possible	No	No	No

Table 3.3: Datchet Increase DO Level 2 WFD summary

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40601G604100	Chiltern Chalk Scarp	Low / Low	2	Assess extent of impact due to new abstraction and establish if this option will negatively impact GW flow and levels, as well as associated SW flow. Further assessments will improve confidence in option.	Option includes for the installation of observation boreholes and a low flow investigation to understand the implications of the abstraction. Study needed to understand if mitigation needed.	Possible	No	No	No

Table 3.4: Southfleet/Greenhithe (new WTW)

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40601G500300	North Kent Medway Chalk	Low /Low	2	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses, making use of existing pumping test data and historical abstraction records, where appropriate. Detailed review of all baseline ecological WFD data. Update to WFD baseline data to include 2019 status (update to cycle 3). Further information about option, including details on abstraction conditions."	Seek alternate ways to maintain flow / improve river WQ (river restoration etc.) of surface water bodies if deemed necessary.	Possible	Possible	No	No
GB40601G501800	West Kent Darent and Cray Chalk	Low / Low	2	Detailed hydrogeological assessment of the impacts of increased groundwater abstraction on water balance and flows to surface water courses, making use of existing pumping test data and historical abstraction records, where appropriate.	Seek alternate ways to maintain flow / improve river WQ (river restoration etc.) of surface water bodies if deemed necessary.	Possible	Possible	No	No

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				Detailed review of all baseline ecological WFD data. Update to WFD baseline data to include 2019 status (update to cycle 3). Further information about option, including details on abstraction conditions."					

Table 3.5: Groundwater Addington

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40601G602200	Epsom North Downs Chalk	Low / Low	2	Detailed review of all baseline ecological WFD data. Detailed hydrogeological assessment of the potential implications on groundwater balance and flow in Epsom North Downs Chalk as a result of increased groundwater abstraction. Update to WFD baseline data to include 2019 status (update to cycle 3) . Further information about option, including details on abstraction conditions.	Use of Clay Stanks in pipeline route where groundwater potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction.	Possible	Possible	No	No

Table 3.6: Woods Farm Increase DO

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030331	Thames Wallingford to Caversham	Low / Low	1	Hydrogeological assessment to understand the implications of increased abstraction on river flow Further information about option, including details on abstraction conditions.	Use of Clay Stanks in pipeline route where groundwater potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction.	No	No	No	No
GB40601G600900	Berkshire Downs Chalk	Low / Low	1	Hydrogeological assessment to understand the implications of increased abstraction on river flow	Best industry practice for the construction of the shaft sites to ensure no new pathways created between groundwater and surface	No	No	No	No

Table 3.7: South East Water to Guildford

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40602G601300	Farnborough Bagshot Beds	Low / Low	1	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme. Hydrological assessment of the impacts of temporary abstraction on flow in the watercourses and GWDTE. Consideration of requirement to return water to the ground (through recharge trenches) or to surface water to help minimise the impact of construction, if required. Further information about option.	Use of Clay Stanks in pipeline route where groundwater potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction.	No	No	No	No
GB40602G601400	Chobham Bagshot Beds	Low / Low	1	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme. Hydrological assessment of the impacts of temporary abstraction on flow in the watercourses and GWDTE. Consideration of requirement to return water to the ground (through recharge trenches) or to surface water to help minimise the impact of construction, if required. Further information about option.	Use of Clay Stanks in pipeline route where groundwater potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction.	No	No	No	No

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB70610019	Basingstoke Canal	Low / Low	2	Detailed review of all additional baseline ecological WFD data and consider requirement for additional data collection. Further information about how the option will be operated. Update assessment with Cycle 3 WFD data, RNAGs and HMWBMM.	Consider need for dewatering for the construction to be discharged into the canal to help maintain flow/water level.	Possible	Possible	No	No

Table 3.8: Moulsford 1

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030331	Thames Wallingford to Caversham	Low / Low	1	Modelling of impact of flow changes on habitat, sedimentation processes and water balance, water quality - understand the water usage area (water returned upstream from STW)	Industry best practice for pollution prevention	Possible	Possible	No	No
GB40601G600900	Berkshire Downs Chalk	Low / Low	1	Further investigation into impact of abstraction on water balance of aquifer and flow in River Thames	Control of earthworks drainage including use of temporary settlement ponds and a dividing bund around the perimeter of the earthworks footprint if required. All vehicles and any chemical/oil storage will be fully bunded to prevent any accidental pollution of groundwater or watercourses.	Possible	Possible	No	Assume that watercourse crossing will not have any in-channel modifications and will be watercourse crossings will be completed via directional drilling.
GB40601G604100	Chiltern Chalk Scarp	Low / Low	0	N/A	Drainage water from the operational area will be disposed of appropriately to avoid pollution. Abstractions would be controlled through licensing.	No	No	No	No

Table 3.9: SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030210	Filchhampstead Brook at Farmoor	Low / Low	1	On-going refinement of the design. Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published	Any dewatering needed for the construction will be discharged to the river to help maintain flow if necessary. Construction methods to minimise need for dewatering in the shallow aquifer (such as diaphragm walls or secant piling).	No	No	No	No
GB106039029780	Bayswater Brook	Low / Low	1	On-going refinement of the design. Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published	Any dewatering needed for the construction will be discharged to the river to help maintain flow if necessary. Construction methods to minimise need for dewatering in the shallow aquifer (such as diaphragm walls or secant piling).	No	No	No	No
GB106039030180	Northfield Brook (Source to Thames) at Sandford	Low / Low	1	On-going refinement of the design. Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB	Any dewatering needed for the construction will be discharged to the river to help maintain flow if necessary.	No	No	No	No

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				measures where relevant) from EA Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published	Construction methods to minimise need for dewatering in the shallow aquifer (such as diaphragm walls or secant piling).				
GB106039030240	Thame (Scotsgrove Brook to Thames)	Low / Low	1	On-going refinement of the design. Request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA Update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published	Any dewatering needed for the construction will be discharged to the river to help maintain flow if necessary. Construction methods to minimise need for dewatering in the shallow aquifer (such as diaphragm walls or secant piling).	No	No	No	No
GB40602G600700	Headington Corallian	Low / Low	1	1) On-going refinement of the design. 2) request for further specific details of mitigation measures assessment and RBMP measures (including A/HWMB measures where relevant) from EA 3) update to WFD baseline data to include 2019 status in line with Cycle 3 2021-2027 RBMPs once published	Any dewatering needed for the construction will be discharged to the river to help maintain flow if necessary. Construction methods to minimise need for dewatering in the shallow aquifer (such as diaphragm walls or secant piling).	No	No	No	No

Table 3.10: River Thames to Fobney Transfer

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030331	Thames Wallingford to Caversham	Low / Low	2	Detailed hydrological assessment of the impacts of 40Ml/d abstraction from watercourse on flow, hydromorphology and water quality / concentration of key physicochemical parameters. Detailed review of all baseline ecological WFD data, including results of any surveys already undertaken for this scheme. Further information about option, including details on abstraction conditions (HOF etc). Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions.	Fish and eel screening applied at intake from River Thames. Abstraction conditions to be set in order to minimise changes to hydrological regime. Any dewatering needed for the construction will be discharged to the river to help maintain flow. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	Possible	Possible	No	No
GB40601G600900	Berkshire Downs Chalk	Low / Low	1	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme. Further information about option.	Use of Clay Stanks in pipeline route where groundwater	No	Possible	No	No

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				Update to WFD baseline data to include 2019 status (update to cycle 3) in order to have better understanding of recent conditions.	potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction. Dewatering to be discharged to local watercourse to help maintain flow - after assessment of impact on watercourse flow and water quality.				

Table 3.11: Abingdon to Farmoor Reservoir Pipeline

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030334	Thames (Evenlode to Thame)	Low / Low	1	Detailed hydrological assessment of the impacts of abstractions on water quality / concentration of key physicochemical parameters in combination with the appropriate SRO option (SESRO)	N/A	Possible	Possible	Yes	No

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				Assumption that the impacts of transfers from SESRO (such as water quality and INNS) will be covered under the corresponding WFD assessments. Further information about option.					

Table 3.12: T2ST

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030334	Thames (Evenlode to Thame)	Low / Medium	0	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Further information about how much additional abstraction will be required for the T2ST scheme	Fish and eel screening at new intake Minimisation of changes to hydrological regime through adjustment of abstraction conditions. Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB106039023220	Lambourn (Source to Newbury)	Low / Medium	1	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about	Any dewatering needed for the construction will be discharged to the river to help maintain flow Provision for de-chlorination of pipeline water when draining down pipeline	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				option crossing of the River Lambourn.	before discharge to watercourse.				surface water to help maintain flows
GB106039023174	Middle Kennet (Hungerford to Newbury)	Low /Medium	1	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydroecological assessment of the impacts of temporary abstraction for dewatering on flow in the watercourses Further information about option crossing of the River Lambourn.	Any dewatering needed for the construction will be discharged to the river to help maintain flow If shafts needed for river crossing these should be located outside of the SSSI/SAC Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	No	No	No	Assumed major river crossings will be carried out using HDD or pipejacking Use of Clay stanks (clay bunds constructed within the pipeline trench) to be used in pipeline route where groundwater potentially encountered, to ensure pipeline route does not become a preferential flow path for groundwater. Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022710	Test Upper	Low /Medium	1	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme	Ensure below ground shaft for river crossing is outside the SSSI boundary Assumes crossing of river will be by	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Test and potential implications on SSSIs.	pipejack or micro tunnel crossings Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.				route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022700	Test - Bourne Rivulet to conf Dever	Low / Medium	1	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Test and potential implications on SSSIs.	Ensure below ground shaft for river crossing is outside the SSSI boundary Provision for de-chlorination of pipeline water when draining down pipeline before discharge to watercourse.	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB107042022770	Dever	Low / Medium	1	Detailed review of all additional baseline ecological WFD data, including results of any surveys already undertaken for this scheme	Place shafts for pipejack or micro tunnel crossings outside of the SSSI areas Provision for de-	No	No	No	Assumed major river crossings will be carried out using pipejack or micro tunnel crossings Assumes clay stanks will be used in pipeline route where potential

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
				Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option crossing of the River Dever and potential implications on SSSI.	chlorination of pipeline water when draining down pipeline before discharge to watercourse.				for interaction with groundwater Assumes dewatering discharge to groundwater or surface water to help maintain flows
GB40601G600900	Berkshire Downs Chalk	Low / Medium	1	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option impacts on SSSI sites.	Dewatering discharge to surface water courses to maintain flow. Use of Clay Stanks in pipeline route where groundwater potentially encountered. Shafts to be sealed to ensure minimal groundwater egress after construction Dewatering to be discharged to local watercourse to help maintain flow	No	No	No	

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40701G501200	River Test Chalk	Low / Medium	2	Additional groundwater monitoring to understand groundwater levels and how they interact with the scheme Investigation in potential contaminated land which could be affected by dewatering for river, road or railway crossings. Detailed hydrological assessment of the impacts of abstraction on flow in the watercourses Further information about option impacts on SSSI sites.	Further investigation into impact on groundwater levels of dewatering for construction and consideration of requirement to return water to the ground (through recharge trenches) to help minimise the impact of construction, if required. Use of Clay Stanks in pipeline route where groundwater potentially encountered. If possible shafts for river crossings should be moved outside of the SSSI sites Shafts to be sealed to ensure minimal groundwater	Uncertain	No	No	

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
					egress after construction				

Table 3.13: SESRO

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039023430	Ock and tributaries (Land Brook confluence to Thames)	Low/Low	2	Hydrological/hydrogeological and water quality assessment to quantify impact of scheme footprint	Clear span bridge over the river and the realignment of a stretch of the River Ock	Possible	No	No	
GB106039023360	Cow Common Brook and Portobello Ditch	Low/Low	3	-	Divert the Cow Common Brook around the footprint of the reservoir, improving the hydromorphological, ecological and water quality of the channel. This should mitigate for the direct loss of channel length and habitat.	Possible	Possible	Possible	
GB106039023380	Childrey Brook and Norbrook at Common Barn	Low/Low	2	-	Realign and improve the hydromorphological, ecological and water quality of Hanney ditch as well as creating additional wetland habitat. This should compensate for channels affected by the reservoir footprint	Possible	Possible	Possible	

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039023410	Sandford Brook (source to Ock)	Low/Low	1	-	-	Possible	No	No	
GB106039030334	Thames (Evenlode to Thame)	Low/Low	2	More work is required to assess the interaction with weir level management and the opportunity to optimise velocity and level with navigation and environmental requirements Assessment of changes in flow and level and potential for benefits/impacts during low flows as it could reduce the vulnerability of habitats to low flow conditions.	-	Possible	No	No	

Table 3.14: STT

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB109054049880	Vrynwy - Lake Vrynwy to conf Afon Cownwy	Medium / Medium	0	Further consideration in the context of Severn Regulation releases which also exert a managed flow regime on the River Vyrnwy is required from a WFD perspective		No	No	No	
GB109054049720	Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy	Medium / Medium	0	Further consideration in the context of Severn Regulation releases which also exert a managed flow regime on the River Vyrnwy is required from a WFD perspective		No	No	No	
GB109054049852	Afon Vyrnwy DS of Banwy confluence	Medium / Medium	0	Further consideration in the context of Severn Regulation releases which also exert a managed flow regime on the River Vyrnwy is required from a WFD perspective		No	No	No	
GB109054049800	Afon Vyrnwy - conf Afon Tanat to conf R Severn	Medium / Medium	0	Further consideration in the context of Severn Regulation releases which also exert a managed flow regime on the River Vyrnwy is required from a WFD perspective		No	No	No	
GB109054049142	Severn - conf Bele Bk to conf Sundorne Bk	Medium / Medium	0	-		No	No	No	

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB109054049141	Severn - Sundorne Bk to conf M Wenlock-Farley Bk	Medium / Medium	0	-		No	No	No	
GB109054049143	Severn conf M Wenlock-Farley Bk to conf R Worfe	Medium / Medium	0	-		No	No	No	
GB109054049145	Severn - conf R Worfe to conf R Stour	Medium / Medium	0	-		No	No	No	
GB109054049144	Severn - conf R Stour to conf River Teme	Medium / Medium	0	-		No	No	No	
GB109054039760	Severn - conf R Teme to conf R Avon	Medium / Medium	0	-		No	No	No	
GB109054044404	Severn - conf R Avon to conf Upper Parting	Medium / Medium	2	-		No	Possible	Possible	

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB109054043840	Avon (Warks) - conf R Sowe to conf R Leam	Medium / Medium	2	Flow monitoring to inform the risk to weir pool habitats in the River Avon associated with the physical changes upstream of Alveston		No	Possible	Possible	
GB109054044402	Avon (Wark) conf R Leam to Tramway Br, Stratford	Medium / Medium	2			No	Possible	Possible	
GB109054044401	Avon- Tramway Br Stratford to Workman Br Evesham	Medium / Medium	2			No	Possible	Possible	
GB109054044403	Avon conf Workman Br, Evesham to conf R Severn	Medium / Medium	2			No	Possible	Possible	
GB106039030334	Thames (Evenlode to Thame)	Low / Medium	0	Further hydraulic modelling of the River Thames to improve confidence		No	No	No	
GB106039030331	Thames Wallingford to Caversham	Low / Medium	0	Further hydraulic modelling of the River Thames to improve confidence		No	No	No	

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039023233	Thames (Reading to Cookham)	Low / Medium	0	Further hydraulic modelling of the River Thames to improve confidence		No	No	No	
GB106039023231	Thames (Cookham to Egham)	Low / Medium	0	Further hydraulic modelling of the River Thames to improve confidence		No	No	No	
GB106039023232	Thames (Egham to Teddington)	Low / Medium	0	Further hydraulic modelling of the River Thames to improve confidence		No	No	No	
GB109054032750	Severn (E Channel) - Horsebere Bk to Severn Est	Medium / Medium	0	-		No	No	No	
GB530905415403	SEVERN UPPER	Medium / Medium	1	-		No	No	No	

Table 3.15: London Reuse: Teddington DRA 75Ml/d

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039023232	Thames (Egham to Teddington)	Medium / Medium	0	Continued spot water quality monitoring programme for WFD chemicals and continuous physico-chemical water quality monitoring at monitoring points in Mogden STW final effluent and the River Thames. Further update to scheme and WFD assessment. Additional model development and model scenarios to support updated assessment.	-	No	No	No	
GB530603911403	THAMES UPPER	Low / Medium	0	Continued use of eDNA to resolve presence of sea lamprey and potentially river lamprey to support further assessment. Continued invertebrate and phytoplankton surveys to support further assessment.	-	No	No	No	

4 Cumulative effects

4.1 BVP Intra-plan effects

4.1.1 No cumulative effects

Table 4.1 below, presents a list of waterbodies which are impacted by more than one of the BVP options presented in this study. The cumulative effects assessment has shown that for the following water bodies cumulative BVP option activities are not anticipated to lead to an increased risk of WFD deterioration at the waterbody scale, over those already identified for individual options.

Table 4.1: Waterbodies where cumulative effects are unlikely to lead to an increased risk of WFD deterioration

Waterbody ID and name	Options	Comments
GB106039017630: Wey (Shalford to River Thames confluence at Weybridge)	• TWU_GUI_HI-TFR_RZ5_ALL_sewtogui - South East Water to Guildford • TWU_GUI_HI-GRW_ALL_ALL_dapdune lic disagg - Dapdune Licence Disaggregation	The South East Water to Guildford option will involve the installation of pipelines within this waterbody. Whilst the Dapdune Licence Disaggregation will involve the separation of groundwater licences (and therefore an increase in total groundwater abstraction). The multiple components are not anticipated to lead to a detrimental effect on the water environment. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale and no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039023232: Thames (Egham to Teddington)	• SESRO • TWU_LON_HI-TFR_LON_ALL_hampton-battersea - TWRM extension - Hampton to Battersea • STT • London Reuse Teddington DRA 75Ml/d	SESRO will involve the transfer of water into this water body and will help support flow in this waterbody during lower flow periods. The TWRM extension - Hampton to Battersea will involve the installation of a new pipeline. Teddington DRA 75 Ml/d option will involve the installation of pipelines within this waterbody and the discharge and abstraction of water from this water body (no impacts on flow and velocity on a water body scale). The cumulative intra-plan effects assessment shows that there is no change to the risk of deterioration in this waterbody, and some of these options are required to occur together, to remove reported adverse effects.
B106039023233: Thames (Reading to Cookham)	• TWU_SWX_HI-TFR_HEN_ALL_henley-swox5 - Henley to SWOX – 5 Ml/d • DP- Playhatch-KV • STT • SESRO	Henley to SWOX will involve installation of pipelines within this waterbody. STT and SESRO will involve transfer of water into this watercourse which could lead to minor localised changes to the water quality. Playhatch DP would lead to an increase in peak licence during droughts. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039023231: Thames (Cookham to Egham)	• TWU_SWA_HI-GRW_ALL_ALL_datchet do - Datchet Increase DO • SESRO • STT	For both SESRO and STT there will be a transfer of water within this waterbody. For Datchet Increase DO there will be a modification of an existing WTW. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, STT and SESRO will include support flow to this watercourse while Datchet will lead to a minor decrease in flow. No additional risk of deterioration is expected from the combination of options. Risk to waterbody remains as **minor localised effect.**

Waterbody ID and name	Options	Comments
GB106039023360: Cow Common Brook and Portobello Ditch	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) • TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline • T2ST • SESRO	All options will involve the installation of a new pipelines. T2ST will involve the construction of a new intake structure, SESRO will involve the channel realignment. The cumulative intra-plan effects of the multiple components are unlikely to have a detrimental effect on the water environment due to the minor nature of the works and the difference in construction timing (2045 for the SWOX to SWA and Abingdon to Farmoor pipeline and early 2030s for SESRO and STT). Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039023410: Sandford Brook (source to Ock)	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) • TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline • SESRO	All options involve the installation of pipelines within this waterbody. Due to the minor nature of the works and the difference in timing of construction (2045 for the SWOX to SWA and Abingdon to Farmoor pipeline and 2032 for SESRO) the cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039023420: Frilford and Marcham Brook	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) • TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline	Both options involve the installation of pipelines within this waterbody. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment, due to the minor nature of the construction works. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039023430: Ock and tributaries (Land Brook confluence to Thames)	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) • TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline • SESRO	Both options involve the installation of pipelines within this waterbody. SESRO will involve the construction of a new culvert, watercourse realignment and transfer of water. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, due to the minor nature of the work for the two pipeline options. No risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039030210: Filchhampstead Brook at Farmoor	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline	Both options involve the installation of pipelines within this waterbody. SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) option will involve dewatering which has the potential impact the waterbody. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale due to the short term nature of the potential impacts, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB106039030333: Thames (Leach to Evenlode)	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe	Both options involve the installation of pipelines within this waterbody. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment due to the minor nature of the work for the two pipeline options. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**

Waterbody ID and name	Options	Comments
	- Abingdon to Farmoor Reservoir Pipeline	
GB106040024222: Middle and Lower Darent	• TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby – ASR Horton Kirby • TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg - Southfleet/Greenhithe (new WTW)	Dewatering within 500m of the river will be required for ASR Horton Kirby, however it is assumed this will be short term and will be discharged back into the river. A new WTW discharge and intake will be installed as well as maintenance and use of an abstraction borehole for Southfleet/ Greenhithe option. Both options involve the installation of pipelines within this waterbody. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment, due to the short term nature of construction impacts. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB40602G600600 : Shrivenham Corallian	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) • TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline • TWU_SWX_HI-IMP_SWX_ALL_wessextoswoxflax - Wessex Water to SWOX (Flaxlands)	All three options involve the installation of pipelines within this waterbody. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment, due to the short term nature of these works. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB40601G601100 : South-West Chilterns Chalk	• TWU_SWX_HI-TFR_HEN_ALL_henley-swox5 • DP-Playhatch KV	Henley to SWOX will involve installation of pipelines within this waterbody and the Playhatch KV option will include a temporary increase in peak abstraction during droughts. The cumulative intra-plan effects of the multiple options are unlikely to have a detrimental effect on the water environment, due to the limited nature of the works. In addition the construction for the Henley SWOX option will occur before the increase in licence at Playhatch and therefore impacts are unlikely occur at the same time. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB530603911402: Thames Middle	• TWU_LON_HI-TFR_LON_ALL_hampton-battersea - TWRM extension - Hampton to Battersea • TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg - Southfleet/Greenhithe (new WTW)	Southfleet/Greenhithe will feature a new WTW as well as maintenance of an existing borehole. Both options involve the installation of pipelines within this transitional water body. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment, due to the limited nature of the works. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody remains as **minor localised effect.**
GB530603911403: Thames Upper	• TWU_LON_HI-TFR_LON_ALL_hampton-battersea - TWRM extension - Hampton to Battersea • London reuse: Teddington DRA	Both options involve the installation of pipelines within this waterbody, and the London Reuse Teddington DRA option also includes potential downstream impacts from abstraction and discharge in the upstream waterbody. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of

Waterbody ID and name	Options	Comments
		deterioration is expected. Risk to waterbody remains as **minor localised effect,** pending the additional assessment for London Reuse: Teddington DRA options.
GB40601G501800 : West Kent Darent and Cray Chalk	• TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby – ASR Horton Kirby • TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg - Southfleet/Greenhithe (new WTW)	Both options will involve use of existing groundwater abstraction outside of licence conditions. This increase in abstraction could lead to changes in groundwater level and impact the flow in surrounding surface waterbodies. However, the cumulative intra-plan effects assessment shows that the combined impacts of the two increases in abstraction would not lead to an increase in the risk to WFD for each option individually. Risk to waterbody **remains as amber adverse effect** as per the individual option assessment.
GB40603G000300 : Lower Thames Gravels	• TWU_LON_HI-TFR_LON_ALL_hampton-battersea - TWRM extension - Hampton to Battersea • TWU_SWA_HI-GRW_ALL_ALL_datchet do - Datchet Increase DO • TWU_LON_HI-ROC_WT1_CNO_kemptonwtw150 - Kempton - 150 – Construction	Datchet Increase DO will involve use of an existing groundwater abstraction outside of actual rates. This increase could lead to changes in groundwater level and impact the water quality of the surrounding surface waterbodies. The remaining options involve minor below ground works for pipeline installation or WTW upgrades. The cumulative intra-plan effects of the multiple pipelines are unlikely to have a detrimental effect on the water environment. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale, no risk of deterioration is expected. Risk to waterbody **remains as amber adverse effect** (as per individual option assessment for Datchet Increase DO option).

4.1.2 Potential for cumulative effects

Table 4.2 below, identifies waterbodies which have been assessed as having the potential for cumulative effects from multiple BVP options leading to a risk of WFD deterioration at a waterbody scale.

Table 4.2: Waterbodies where cumulative effects from BVP options could lead to an increased risk of WFD deterioration

Waterbody ID and name	Options	Comments
GB106039030331: Thames Wallingford to Caversham	• TWU_SWX_HI-GRW_ALL_ALL_woods farm do - Woods Farm Increase DO • TWU_SWX_HI-GRW_ALL_ALL_moulsford gw – Moulsford 1 • TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney – River Thames to Fobney Transfer • SESRO • STT • DP-Gatehampton SWOX • DP-Playhatch KV	STT will involve the transfer of water into this water body. SESRO will involve the construction of a new culvert, watercourse realignment and transfer of water into this water body. River Thames to Fobney Transfer will involve dewatering, installation of a new pipeline and intake structure and new surface water abstraction. This option has the potential to reduce flow and velocity as well increase physical modification (mitigation measures assessment). For Moulsford 1 will involve installation of a new pipeline and new abstraction borehole and increased groundwater abstraction. This could lead to reduce groundwater levels and could lead to a reduction in flow. Woods Farm Increase DO will involve a new abstraction boreholes and increased groundwater abstraction. This could lead to reduce groundwater levels and could lead to a reduction in flow. The cumulative effect of these numerous impacts on flow and velocity and therefore water quality and biology could lead to a change in the risk of deterioration in this water body and is expected to **increase the risk from minor localised** to **amber adverse risk.** Further assessment is required to confirm this.

Waterbody ID and name	Options	Comments
GB106039030334: Thames (Evenlode to Thame)	• TWU_SWA_HI-TFR_SWX_ALL_swoxswa48 - SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) • TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe - Abingdon to Farmoor Reservoir Pipeline • T2ST • SESRO • STT	SESRO will involve the construction of a new culvert, watercourse realignment and transfer of water. T2ST will involve a new surface water abstraction. STT will involve a transfer of water. SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA) will involve the construction of a new pipeline. Abingdon to Farmoor Reservoir Pipeline will involve a transfer of water, new intake structure, new discharge from WTW and additional abstraction maybe required. This could lead to reduction of flow and velocity and could lead to a reduction in flow. The cumulative effect of these numerous impacts on flow and velocity and therefore water quality and biology could lead to a change in the risk of deterioration in this water body and is expected to **increase the risk from a minor localised to amber adverse risk**.
GB40601G600900 Berkshire Downs Chalk	• TWU_SWX_HI-GRW_ALL_ALL_woods farm do - Woods Farm Increase DO • TWU_SWX_HI-GRW_ALL_ALL_moulsford gw – Moulsford 1 • TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney - River Thames to Fobney Transfer • T2ST	T2ST will involve dewatering which could lead to temporary reduced groundwater levels. Woods Farm Increase DO will involve a new abstraction boreholes and installation of a new pipeline. Moulsford 1 will involve drilling of new boreholes and a new abstraction licence. River Thames to Fobney Transfer will involve temporary construction dewatering. All of these options therefore could lead to reductions in groundwater levels (water balance) and could lead to a reduction in flow in surface water bodies supported by this groundwater body. Cumulative intra-plan effects could therefore lead to an **increase in the risk of deterioration** to this water body.
GB40601G604100 Chiltern Chalk Scarp (GW)	• TWU_SWX_HI-GRW_RE1_ALL_britwell roc - Britwell Removal of Constraints • TWU_SWX_HI-GRW_ALL_ALL_moulsford gw – Moulsford 1 • DP-Gatehampton SWOX	Both options will increases in groundwater abstraction; Britwell Removal of constraints involves use of existing groundwater abstraction licence with existing conditions, and Moulsford 1 an increase in abstraction licence. Both of these could impact on the water balance. Cumulative intra-plan effects could therefore lead to **an increase in the risk of deterioration** to this water body.

4.2 BVP Inter-plan effects

As mentioned in Section 4.2, information has been collated on planning projects within a 2km buffer of the BVP options. This assessment, then, identifies which options and/or planning projects impact the same waterbody and identifies whether an increase in impact on that waterbody is likely. Lists the various planning projects that have been included in the below inter-plan cumulative effects assessment, which occur in the same waterbodies as the BVP options.

Table 4.3: Planning projects included within same waterbodies as BVP options

Project code	Name	Description
ALL.WAS.LON4	342 Twickenham Depot	Waste Site
ALL.WAS.LON6	A12-EN Eleys Estate	Integrated resource recovery facilities/resource parks, Thermal treatment, anaerobic digestion, pyrolysis/gasification, mechanical biological treatment, Waste transfer, indoor composting, in-vessel composting, processing and recycling
ALL.WAS.LON8	A19-HR Brantwood Road	Thermal treatment, anaerobic digestion, pyrolysis/gasification, mechanical biological treatment, waste transfer, processing and recycling. Areas not within Source Protection Zone 1 are potentially suitable to handle hazardous waste.

Project code	Name	Description
ALL.WAS.LON9	A21-HR North East Tottenham	Thermal treatment, anaerobic digestion, pyrolysis/gasification, mechanical biological treatment, waste transfer, processing and recycling. Areas not within Source Protection Zone 1 are potentially suitable to handle hazardous waste.

4.2.1 No cumulative effects

Table 4.4 below, identifies waterbodies which are impacted by one of the BVP options and one or more planning projects, but where the cumulative effects assessment has shown that the BVP option and planning projects (inter-plan effects) will not lead to an increased risk of WFD deterioration at the waterbody scale, over those already identified for individual options..

Table 4.4: Waterbodies where cumulative effects are unlikely to lead to an increased risk of WFD deterioration

Waterbody ID and name	Options	Comments
GB106039023030: Crane	• London reuse: Teddington DRA 75Ml/d • ALL.WAS.LON4	Teddington DRA would involve construction of pipeline through this waterbody. This option is selected in 2024. Other activities include the redevelopment of Twickenham Depot waste site, which could start construction in the next three years. Although both options may be under construction together, it is anticipated that there would be **no change** to the risk of deterioration in this waterbody.
GB106038027940 Pymmes Brook (upper channel with Muswell St & Bounds Grn Brk)	• TWU_KGV_HI-TFR_KGV_ALL_lock wood ps-kgv res • ALL.WAS.LON6	TLT extension from Lockwood PS to King George V Reservoir intake will involve installation of a new pipeline and with associated below ground structures. This option is selected in 2024. Other activities include construction of new and existing buildings, which could start construction in the next three years. Although both options may be under construction together, it is not anticipated that there would be a change to the risk of deterioration in this waterbody. Risk to the waterbody remains as **minor localised effect** as per option TLT extension from Lockwood PS to King George V Reservoir intake.
GB106038027910 Pymmes and Salmon Brooks - Deephams STW to Tottenham Locks	• TWU_KGV_HI-TFR_KGV_ALL_lock wood ps-kgv res • ALL.WAS.LON6	TLT extension from Lockwood PS to King George V Reservoir intake will involve installation of a new pipeline and with associated below ground structures. This option is selected in 2024. Other activities include construction of new and existing buildings, which could start construction in the next three years. Although both options may be under construction together, it is not anticipated that there would be a change to the risk of deterioration in this waterbody. Risk to the waterbody remains as **minor localised effect** as per option TLT extension from Lockwood PS to King George V Reservoir intake.
GB106038027920 Moselle Brook	• TWU_KGV_HI-TFR_KGV_ALL_lock wood ps-kgv res • ALL.WAS.LON8	TLT extension from Lockwood PS to King George V Reservoir intake will involve installation of a new pipeline and with associated below ground structures. This option is selected in 2024. Other activities include new waste management facilities, which could start construction in the next three years. Although both options may be under construction together, it is not anticipated that there would be a change to the risk of deterioration in this waterbody. Risk to the water body remains as a **minor localised effect** as per option TLT extension from Lockwood PS to King George V Reservoir intake.
GB106038027910 Pymmes and Salmon Brooks - Deephams STW to Tottenham Locks	• TWU_KGV_HI-TFR_KGV_ALL_lock wood ps-kgv res • ALL.WAS.LON9	TLT extension from Lockwood PS to King George V Reservoir intake will involve installation of a new pipeline and with associated below ground structures. This option is selected in 2024. Other activities include new waste management facilities, which could start construction in the next three years. Although both options may be under construction together, it is not anticipated that there would be a change to the risk of deterioration in this waterbody. Risk to the water body remains as a **minor**

Waterbody ID and name	Options	Comments
		localised effect as per option TLT extension from Lockwood PS to King George V Reservoir intake.

4.2.2 Potential for cumulative effects

No additional water bodies that have the potential for a cumulative impact as a result of BVP options and planning project activities occurring over those set out in Table 4.2.

5 Other Thames Water WRMP plans

5.1 Least cost plan and Best environmental and societal plan

As part of the Thames Water WRMP two other plans are also considered, the Least cost plan (LCP) and the Best Environmental and Societal plan (E&SP) which contains some different options to those set out in the BVP. The majority of the differences between the BVP, LCP and E&SP either form parts of the SRO projects or are options selected past 2050. The two new options which is included in the LCP and E&SP (and not included in either the BVP, SRO or selected later than 2050) are

- TWU_SWX_HI-TFR_SWX_ALL_dukescut-farmoor: Dukes Cut to Farmoor transfer; and
- TWU_SWA_HI-TFR_HEN_ALL_henley-swa5: Henley to SWA – 5 Ml/d

The results of the Level 1 and Level 2 assessments are included in this section for completeness.

In addition, to these new options, two of the SRO options are included at a different size to those in the BVP:

- SESRO - 150Mm^3 option
- STT - 300Ml/d option

In both cases the change in the option size does not alter the outcome of the WFD assessment, and the summaries presented in Section 3.2 remain valid.

5.2 Level 1 assessment summary

5.2.1 Dukes Cut to Farmoor transfer

The Level 1 WFD assessment covered five water bodies for the Dukes Cut to Farmoor transfer option. The outcomes indicated further assessment would be necessary for two waterbodies: GB106039030334 Thames (Leach to Evenlode) river water body and GB70610542 Oxford Canal, Thrupp to Thames canal water body.

Table 5.1: WFD Level 1 assessment outcomes for Dukes Cut to Farmoor transfer

Dukes Cut to Farmoor transfer	
Option ID	TWU_SWX_HI-TFR_SWX_ALL_dukescut-farmoor
Option Description	Transfer of water from Dukes Cut to Farmoor
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB106039030334 - Thames (Evenlode to Thame) GB106039030310: Chil and Limb Brooks (source to B4044) GB106039029880: Evenlode (Glyme to Thames)
Number of waterbodies requiring further WFD assessment	2
Waterbodies requiring further WFD assessment	GB106039030333: Thames (Leach to Evenlode) GB70610542: Oxford Canal, Thrupp to Thames

5.2.2 Henley to SWA – 5 Ml/d

The Level 1 WFD assessment covered five water bodies for the Henley to SWA option. The outcomes indicated further assessment would be necessary for two waterbodies: GB40601G602600 Maidenhead Chalk and GB40601G601100 South-West Chilterns Chalk groundwater bodies.

Table 5.2: WFD Level 1 assessment outcomes for Henley to SWA

Henley to SWA	
Option ID	TWU_SWA_HI-TFR_HEN_ALL_henley-swa5
Option Description	Transfer of water from Henley WRZ to SWA WRZ
Number of waterbodies passing WFD assessment	3
Waterbodies passing WFD assessment	GB106039023720: Hamble Brook GB106039023233: Thames (Reading to Cookham) GB106039023160: Loddon (Swallowfield to River Thames confluence)
Number of waterbodies requiring further WFD assessment	2
Waterbodies requiring further WFD assessment	GB40601G602600: Maidenhead Chalk GB40601G601100: South-West Chilterns Chalk

5.3 Level 2 WFD assessment summary

5.3.1 Dukes Cut to Farmoor transfer

Two water bodies were identified as requiring further assessment for the Dukes Cut to Farmoor transfer option: GB106039030334 Thames (Leach to Evenlode) river water body and GB70610542 Oxford Canal, Thrupp to Thames canal water body.

The Level 2 WFD assessment for Thames (Leach to Evenlode) identified potential deterioration risk to physico-chemical quality elements of this water body, due to the new discharge of water from the canal transfer. The water quality in the Oxford canal has a lower status classification for dissolved oxygen and biological oxygen demand than the River Thames. This could also impede achievement of water body objectives. The assessment highlights potential benefits of increased flow in the River Thames in a water body which has a current hydrological regime status of does not support Good, potentially helping to attain waterbody objectives.

The canal body Level 2 WFD assessment identified a potential risk of deterioration to the mitigation measures assessment due to changes in flow and level in the canal from the new surface water abstraction.

The RNAG for the Thames (Leach to Evenlode) river water body relate to:

- Mitigation measures assessment and invertebrates due to ‘physical modifications.
- Fish due to non-native invasive species and physical modifications.
- Phosphate due to ‘Pollution from waste water’ and ‘pollution from rural areas’. Two RBMP Programme of measures are in place to address these water quality issues.
- Dissolved oxygen due to ‘Pollution from waste water’, ‘pollution from rural areas’, changes in natural flow and levels (water industry) and physical modifications.
- Hydrological regime due to changes in natural flow and levels (water industry).

This option includes the discharge of water into this waterbody which could help towards achieving good status for hydrological regime, and dissolved oxygen (where due to changes in natural flow and levels (water industry)). However, the water quality of the water being

discharges may be of worse quality than this water body and as such could impact on the potential to achieve good status on phosphate and dissolved oxygen (where due to pollution). Further assessment is required to investigate whether this option will limit the achievement of good status on phosphate and dissolved oxygen.

A summary of the Level 2 WFD assessment is included in Table 5.3, detailed outputs are presented in Annex B.

5.3.2 Henley to SWA – 5 Ml/d

Two water bodies were identified as requiring further assessment for the Henley to SWA transfer option: GB40601G602600 Maidenhead Chalk and GB40601G601100 South-West Chilterns Chalk groundwater bodies.

The Level 2 WFD assessment for both water bodies identified minor localised risks to Quantitative dependent surface water body status and water balance status due to temporary changes in groundwater levels from dewatering for construction and are not considered to lead to a risk of deterioration at the waterbody scale.

The RNAG for the South-West Chilterns Chal groundwater body relate to Quantitative dependent surface water body status and Quantitative water balance due to ‘water industry (groundwater abstraction)’. This option includes for potential requirement for abstraction for dewatering during construction. The additional abstraction could lead to minor temporary changes in groundwater flow, and a minor risk of a reduction in improvements which could be made.

The RNAG for the Maidenhead Chalk groundwater body relate to trend assessment due to ‘pollution from waste water’, ‘pollution from rural areas’ and ‘pollution from towns, cities and transport’. This option is not anticipated to impact on the potential to achieve good status.

A summary of the Level 2 WFD assessment is included in Table 5.4, detailed outputs are presented in Annex B.

Table 5.3: Dukes Cut to Farmoor transfer Level 2 WFD summary

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB106039030333	Thames (Leach to Evenlode)	Low / Low	2	Detailed review of all additional baseline ecological WFD data, to assess impacts on biology particularly from changes in water quality. Further information about how the option will be operated. Water quality assessment to investigate impacts of changes in water quality on biology Update assessment with cycle 3 WFD data	Adjustment of discharge conditions to minimise impact on biology, hydrolomorphology and water quality.	Possible	Possible	No	No
GB70610542	Oxford Canal, Thrupp to Thames	Low / Low	2	Study to identify changes in water level from new abstraction, including impacts on biology and water quality Further information about how the option will be operated. Update assessment with cycle 3 WFD data."	Adjustment of abstraction conditions to limit impact on canal levels.	Possible	Possible	No	No

Table 5.4: Henley to SWA transfer option Level 2 WFD summary

Waterbody ID	Waterbody Name	Confidence in WFD data / Confidence in option design	Maximum impact scope	Requirements to improve confidence	Mitigation measures	Deterioration between status classes	Compromises water body objectives	Assists attainment of water body objectives	Further comments
GB40601G602600	Maidenhead Chalk	Low / Low	1	Further design information on major crossings dewatering design for shafts Update assessment with cycle 3 WFD data	Dewatering discharge to surface water or groundwater to minimise impact of dewatering during construction	No	No	No	-
GB40601G601100	South-West Chilterns Chalk	Low / Low	1	Further design information on major crossings dewatering design for shafts Update assessment with cycle 3 WFD data	Dewatering discharge to surface water or groundwater to minimise impact of dewatering during construction	No	No	No	-

5.4 Cumulative intra-effects on LCP and BESP

Both the LCP and BESP include two additional options, which are not included in the BVP. This section discusses the potential implications of these options on the cumulative effects assessment (as set out in Section 4.1).

These two options would lead to additional potential cumulative effects on five waterbodies

- GB106039030334: Thames (Evenlode to Thame)
- GB106039030333: Thames (Leach to Evenlode)
- GB40601G601100: South-West Chilterns Chalk
- GB106039023233: Thames (Reading to Cookham)
- GB106039029880: Evenlode (Glyme to Thames)

The BVP cumulative effects assessment sets out that for the BVP there is a risk of deterioration to the Thames (Evenlode to Thame) waterbody when considering the cumulative effects of the BVP options. The inclusion of Dukes Cut to Farmoor transfer to this assessment, does not change the outcome and **a risk of deterioration will remain unchanged (amber adverse)**.

The BVP cumulative effects assessment sets out that no risk of deterioration is anticipated on the Thames (Leach to Evenlode) water body. With the inclusion of the Dukes Cut to Farmoor transfer to this assessment, although **there is a risk of deterioration (amber adverse)**, this **will not be increased** from that set out in the Dukes Cut to Farmoor transfer assessment.

Both the South Chilterns chalk groundwater body and Thames (Reading to Cookham) river waterbody were assessed in the BVP cumulative effects assessment, and no risk of deterioration was anticipated. The introduction of the Henley to SWA transfer **will not lead to a change** this cumulative assessment (risk **remains as minor localised**).

The Evenlode (Glyme to Thames) river waterbody was not considered in the BVP cumulative assessment. With the introduction of the Dukes Cut to Farmoor transfer, two options would occur in this waterbody (the second being SWOX to SWA (TWU_SWA_HI-TFR_SWX_ALL_swoxswa48: Abingdon WTW to Long Crendon to supply SWA). Both options will involve the installation of pipelines within this waterbody. Cumulative intra-plan effects are unlikely to be significant at a waterbody scale and no risk of deterioration is expected. Risk to waterbody **remains as minor localised effect**.

5.5 Cumulative inter-effects on LCP and BESP

There are no new inter-plan effects for the LCP and BESP, over those set out in the BVP (see Section 4.2).

6 Conclusions

6.1 Level 1 summary

For the Thames Water WRMP24 BVP, 34 options were selected. Of these, 11 options form part of SRO projects and two are considered under drought plans. The Level 1 WFD assessments indicated that 12 options are anticipated to have very low risks of being non-compliant with WFD objectives, and do not require further assessment (as shown in Table 6.1).

Table 6.1: Thames Water WRMP24 BVP options which required no additional assessment

Option ID	Option title
TWU_LON_HI-TFR_LON_ALL_lockwood ps-kgv res	TLT extension from Lockwood PS to King George V Reservoir intake
TWU_LON_HI-TFR_LON_ALL_hampton-battersea	Thames Water Ring Main extension – Hampton to Battersea
TWU_SWX_HI-IMP_SWX_ALL_wessextoswoxflax	Wessex Water to SWOX (Flaxlands)
TWU_SWX_HI-TFR_HEN_ALL_henley-swox5	Transfer from Henley WRZ to SWOX WRZ 5 Ml/d
TWU_HEN_HI-TFR_KVZ_ALL_tw(kv)to(hen)con	Thames Water (Kennet Valley) to Thames Water (Henley) Conveyance
TWU_LON_HI-ROC_WT1_CNO_kemptonwtw150	Kempton WTW 150Ml/d
TWU_SWX_HI-TFR_SWA_ALL_tw(swa)to(swx)con	Thames Water (SWA) to Thames Water (SWOX) Conveyance
TWU_GUI_HI-GRW_ALL_ALL_dapdune lic disagg	Dapdune Licence Disaggregation
TWU_KVZ_HI-GRW_ALL_ALL_mortimer recomm	Mortimer Disused Source (Recommission)
TWU_SWX_RE-DRP_ALL_ALL_dp-gatehampton-swox	DP-Gatehampton-SWOX
TWU_KVZ_RE-DRP_ALL_ALL_dp-playhatch-kv	DP- Playhatch-KV

6.2 Level 2 summary

WFD Level 2 assessments have been completed for 22 of the remaining options that make the BVP. 11 of these were carried out under the relevant SRO projects and the findings are summarised in this report. Post-2050 options are not taken forward for further assessment or inclusion in the cumulative effects assessment at this stage due to the uncertainties regarding future environment for these options These are set out in Table 6.2.

Table 6.2: Thames Water WRMP24 BVP options which required additional assessment at Level 2

Option ID	Option title
TWU_SWX_HI-GRW_RE1_ALL_britwell roc	Britwell removal of constraints
TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby	ASR Horton Kirby
TWU_SWA_HI-GRW_ALL_ALL_datchet do	Datchet increase in DO
TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	Southfleet Greenhithe new WTW
TWU_LON_HI-GRW_ALL_ALL_addington gw	Groundwater Addington
TWU_SWX_HI-GRW_ALL_ALL_woods farm do	Woods Farm increase DO
TWU_GUI_HI-TFR_RZ5_ALL_sewtogui	South East Water to Guilford

Option ID	Option title
TWU_SWX_HI-GRW_ALL_ALL_moulsford gw	Moulsford 1
TWU_SWA_HI-TFR_SWX_ALL_swoxswa48	SWOX to SWA (Abingdon WTW to Long Crendon to supply SWA)
TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney	River Thames to Fobney Transfer
TWU_SWX_HI-TFR_STR_ALL_abing-farmoor pipe	Abingdon to Farmoor Reservoir pipeline
TWU_KVZ_HI-TFR_T2S_ALL_t2st cul to speen	SRO: T2ST
TWU_STR_HI-RSR_RE1_CNO_abingdon100(lon)	SRO: SESRO
TWU_SWX_HI-ROC_WT1_CNO_abingdon wtw ph1	
TWU_SWX_HI-ROC_WT2_ALL_abingdon wtw ph2	
TWU_STT_HI-IMP_STT_CNO_sttpipe500(lon)	SRO: STT
TWU_STT_HI-RAB_RE1_ALL_p9-500-vyrnwy_100_b	
TWU_STT_HI-REU_RE1_ALL_p5-500-neth_p35	
TWU_U7T_HI-RAB_RE1_ALL_p1-500-unsupported	
TWU_TED_HI-RAB_RE1_CNO_teddington dra 75	SRO: London Reuse: Teddington DRA
TWU_LON_HI-TFR_LON_ALL_teddingtondrated/tlt	
TWU_LON_HI-TFR_LON_ALL_teddingtondramog/ted	

The majority of the options assessed as part of the BVP have only been subject to high level design and if they are taken forward would require additional design and assessment as they progress to next stage of optioneering. Due to this, the confidence in the option design has been rated as low throughout all of the Level 2 assessments undertaken. For the SRO options, WFD assessments have been undertaken using the Gate 2 designs and therefore design is assessed as medium confidence.

The findings indicate that there are precautionary WFD compliance risks associated primarily with the operation of additional/new abstractions and new or ceased discharges (see summaries provided in Section 3.2). The potential hydrological effects of these activities, among several other varying impacts, could conflict with achieving WFD status objectives. This is particularly the case where hydrology/river flow is an existing limiting factor, recorded in WFD baseline data as a ‘reason for not achieving good’. The potential biological effects, particularly on fish, and physio-chemical changes (for example, reduced dilution as a result of a new or increased abstraction) would require further assessment to improve certainty of the scale of effects.

For groundwater bodies deterioration risks were primarily associated with changes to quantitative surface water dependent status elements or GWDTE dependent status elements, as a result of new or increased groundwater abstractions, or construction of below ground works.

For new or modified intakes, it is recognised that appropriate fish and eel screening would be required to prevent entrainment. At this stage, this has been considered as likely mitigation, but moderate/amber risks have been maintained until option designs and assessments are further progressed. The same conservative approach has been taken with other likely mitigation such as using trenchless methods to cross watercourses where feasible or discharging dewatered water into a watercourse to maintain flow.

6.3 Further investigations and assessment

Subject to their progression through the approvals process, of those options which have been assessed at Level 2, further WFD mitigation and assessment would be required for the BVP options set out in Table 6.3. At this stage the Level 2 assessments have assessed a potential risk of deterioration to some waterbodies due to these options. Additional investigations and

information are required to improve the certainty of the levels of WFD risk outlined in the WRMP WFD Level 2 assessments.

Table 6.3: Thames Water WRMP24 BVP Level 2 assessed options which require further investigation

Option ID	Option title	Waterbodies currently at risk of deterioration
TWU_SWX_HI-GRW_RE1_ALL_britwell roc	Britwell removal of constraints	GB40601G604100: Chiltern Chalk Scarp
TWU_LON_HI-GRW_RE1_ALL_asrhortonkirby	ASR Horton Kirby	GB40601G501800: West Kent Darent and Cray Chalk
TWU_SWA_HI-GRW_ALL_ALL_datchet do	Datchet increase in DO	GB40601G604100: Chiltern Chalk Scarp
TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	Southfleet Greenhithe new WTW	GB40601G500300: North Kent Medway Chalk GB40601G501800: West Kent Darent and Cray Chalk
TWU_LON_HI-GRW_ALL_ALL_addington gw	Groundwater Addington	GB40601G602200: Epsom North Downs Chalk
TWU_GUI_HI-TFR_RZ5_ALL_sewtogui	South East Water to Guilford	GB70610019: Basingstoke Canal
TWU_KVZ_HI-TFR_UTC_ALL_thamestofobney	River Thames to Fobney Transfer	GB106039030331: Thames Wallingford to Caversham GB40601G600900: Berkshire Downs Chalk
T2ST	T2ST	GB40701G501200: River Test Chalk
SESRO	SESRO	GB106039023380: Childrey Brook and Norbrook at Common Barn GB106039023410: Sandford Brook (source to Ock) GB106039023360: Cow Common Brook and Portobello Ditch GB106039023430: Ock and tributaries (Land Brook confluence to Thames) GB106039030334: Thames (Evenlode to Thame)
STT	STT	GB109054043840: Avon (Warks) -conf R Sowe to conf R Leam GB109054044402: Avon (Wark) conf R Leam to Tramway Br, Stratford GB109054044401: Avon-Tramway Br Stratford to Workman Br Evesham GB109054044403: Avon conf Workman Br, Evesham to confR Severn GB109054044404: Severn -conf R Avon to conf Upper Parting

6.4 BVP Intra-plan and inter-plan effects summary

6.4.1 Intra-plan effects

The Intra-plan cumulative effects assessment has identified 21 water bodies which are impacted by more than one BVP option. Of these water bodies, four of the waterbodies assessed indicate that there is a potential risk of cumulative impacts (i.e. multiple options could lead to a change in risk of WFD deterioration) and further assessment is needed to confirm this.

6.4.2 Inter-plan effects

The Inter-plan cumulative effects assessment identified 5 water bodies which are impacted by more than one BVP option and one or more planning project. The cumulative effect assessment indicated that none of these waterbodies are at risk of further deterioration due to the

combination of options and planning projects. Further information on the planning projects would be required to quantify the cumulative effects on these water bodies

6.5 LCP and BESP

WFD Level 2 assessments have been completed for two additional options which are included in the LCP and BESP but not in the BVP. The Level 2 assessments found no risk of deterioration associated with the Henley to SWA transfer. However, a risk of deterioration was found for the Dukes Cut to Farmoor option, on the Thames (Leach to Evenlode) river water body and Oxford Canal, Thrupp to Thames due to transfer of water of a poorer quality than the receiving waterbody.

The intra-plan cumulative effects assessment was reviewed and identified an additional water body which would be impacted by more than one BVP option, and changes to four other waterbodies. Of these water bodies, one water body assessed indicated that there is an increase in deterioration but not over that already set out in the individual assessment.

6.6 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 Waterbody (HMWB) measures 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 hydromorphological elements identified as being at yellow, amber, or red risk in the Level 2 assessments. This may include existing Environment Agency and Thames Water long term WFD and water quality monitoring data within the relevant waterbodies, and targeted baseline surveys being undertaken specifically for the option assessments.
- Development of a conceptual model linking together how potential hydrological changes 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 assessment and investigations as set out in the WFD assessment and SRO WFD assessments.
- Further information on the design and operation of the options.
- Assessment of the combined potential WFD effects/risks of inter-reliant multiple options.
- Update to Level 2 WFD assessments to incorporate additional information.

The Cycle 3 River Basin Management Plans (RBMPs) are also due to be published at the end of 2022, which may bring about changes in the baseline status and objectives for waterbodies. Where necessary, changes will need to be accounted for in updates to the WFD assessments at the next stage.

A. Updated Level 1 output tables

The updated Level 1 WFD outputs are available on request.

B. Level 2 assessment output tables

The outputs from the further WFD assessment undertaken can be provided upon request.


Thames
Water