Thames Water

Final Water Resources Management Plan 2019

Technical Appendices

Appendix BB: Water Framework Directive

Final Water Resources Management Plan 2019 Appendix BB: Water Framework Directive Assessment – April 2020

Report for Thames Water Utilities Ltd

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Thames Water Utilities Ltd

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Non-Technical Summary

A Water Framework Directive (WFD) assessment of the Thames Water Water Resources Management Plan (WRMP) 2019 (WRMP19) has been carried out as specified in government and regulatory guidance. The WFD assessment has considered all of the Thames Water WRMP option elements, and subsequently all options, a range of reasonable alternative programmes and the preferred programme. For each, a WFD compliance assessment has considered their implications against the objectives of the WFD for all potentially affected water bodies designated under the WFD. The WFD objectives include: the risk of adverse effects on WFD status; 'status deterioration' as described in the WFD; and the risk of preventing water bodies achieving their target WFD status. The findings of the WFD assessments of option elements, options and alternative programmes were used by Thames Water to help reach decisions on the preferred programme for its WRMP19.

The preferred programme is considered compliant with the WFD objectives of the relevant water bodies, now and in the future, as no WFD non-compliance has been confirmed. There is currently one compliance uncertainty in respect of the Epsom groundwater (removal of constraints) option. That option alone requires further investigation and assessment to confirm there is no WFD deterioration risk to the surface water linked to the groundwater abstraction from the aquifer. The option involves abstraction within the existing abstraction licence conditions which will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. Currently impacts are mitigated by third party flow augmentation. The proposed increase in abstraction at Epsom (but within current licence) may need to be mitigated, for example through an increase in flow augmentation, however this is subject to the planned investigation and would need to be agreed with the Environment Agency following an options appraisal if required. With any required mitigation in place the scheme would be considered WFD compliant. Should the planned investigation identify the option as non-sustainable, or where the incorporating mitigation measures are considered not to be appropriate or effective, then the option programmed for operation in 2030 would be replaced in the 2024 WRMP by an alternative option.

It is noted that, operating, the South East Strategic Reservoir, the Culham to Farmoor transfer and the supported Severn-Thames Transfer scheme together will all modulate flow in the River Thames locally at Culham and downstream in the River Thames. For these options, a combined detailed operating strategy will be developed with environmental regulators and other stakeholders to manage these flow modulation effects through operating rules to ensure WFD compliance in terms of the potential ecological impacts on the River Thames locally and downstream.

The Environment Agency and Natural Resources Wales require the collection and consideration of further evidence for three of the options within the preferred programme to either confirm the provisional assessment of WFD compliance, or to identify appropriate mitigation actions to ensure this. These options are:

- The Vyrnwy support element of a Severn-Thames Transfer requires the collection and consideration of further evidence, and if necessary the provision of additional mitigation measures, prior to confirming WFD compliance in the Afon Vyrnwy WFD water bodies downstream of Vyrnwy Reservoir. It should be noted that we have included costs for this option to develop a pipeline to enable the flow support to be discharged directly from the reservoir to the River Severn if necessary, should the additional detailed survey evidence demonstrate that mitigation measures cannot secure WFD compliance.
- The Deephams Reuse option requires the collection and consideration of further evidence, and if necessary the provision of additional mitigation measures, prior to confirming the assessment of WFD compliance in the lowest freshwater water body of the River Lee and the potential for interaction with tidal Middle Thames estuary.
- The Oxford Canal Transfer to Cropredy option requires the collection and consideration of further evidence, and if necessary the provision of additional mitigation measures, prior to confirming the assessment of WFD compliance local to the source waters in the Birmingham groundwater (both groundwater and linked surface waters) and in the River Cherwell from the point it would receive transferred water and downstream.

There are no in-combination WFD compliance effects from Thames Water's WRMP preferred programme with information available (April 2020) from other water company WRMPs. No in-combination WFD effects have been identified in respect of the Affinity Water WRMP19. The South East Strategic Reservoir option would be jointly promoted by both Thames Water and Affinity Water and the combined operation of the option is what has been assessed (as WFD compliant) within this WFD compliance assessment.

Development of the preferred programme

In helping to inform and determine the preferred programme, six "reasonable alternative" programmes were considered and subject to WFD assessment:

- the least cost programme (Phased_LC)
- favouring intergenerational equity (Min_IGEQ)
- favouring resilience and cost equally (Multi-obj_RES)
- favouring customer preference for the frequency of restrictions and cost equally (Multi-obj_FP)
- favouring resilience with a programme cost restriction of 120% of least cost (NearO_RES)
- favouring customer preference for type of options with a programme cost restriction of 120% of least cost (NearO_TP)

Following a review of these six short-listed programmes and taking into account the findings of the WFD and other environmental assessments, a **preferred programme** was identified and taken forward for further environmental assessment associated with the individual schemes that make up that programme. In developing the preferred programme, Thames Water considered the findings of the WFD assessment of the six alternative programmes as summarised below.

Least Cost programme

The Least Cost programme includes the Britwell groundwater option for which there is currently insufficient evidence to fully assess the potential impacts. The risk of adverse effects requires further investigation and is currently assessed as uncertain. Further investigations may lead to a requirement for additional mitigation measures to confirm WFD compliance, which may be challenging to achieve without affecting the deployable output of this scheme. The least-cost programme also includes the Ashton Keynes and Epsom groundwater removal of constraints options, the effects of which may need to be mitigated, for example through additional abstraction licence conditions and/or an increase in flow augmentation, following completion of further investigations. With any required mitigation in place, these two schemes would be considered WFD compliant.

The Least Cost programme also includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option. The Environment Agency requires the collection and consideration of further evidence, and if necessary the provision of additional mitigation measures, prior to confirming the conclusion of WFD compliance for these options.

Multi-obj_RES programme

This programme includes the same small groundwater options with WFD uncertainties as the Least Cost programme and in addition support elements for a support Severn-Thames Transfer option. The Minworth effluent transfer element of a supported Severn-Thames Transfer option carries a WFD compliance risk that requires further consideration of the effect on sanitary, nutrient and chemical water quality, as well as water temperature and consequently aquatic ecology of mixing tertiary treated effluent into the River Avon downstream of Warwick, particularly under low river flow conditions in the River Avon. At present, the ability to secure WFD compliance for this water body for this option remains a challenge and requires more extensive site environmental investigations to assess the risk in more detail and, if necessary, develop additional mitigation measures to secure compliance.

The Vyrnwy support element of a Severn-Thames Transfer option requires further site environmental surveys and investigations and, if necessary, the inclusion of additional mitigation measures prior to confirming the conclusion of WFD compliance, noting this is not as significant or as challenging as the uncertainty surrounding the Minworth effluent transfer support element.

This programme also includes the 15Ml/d Oxford Canal Transfer to Cropredy option. The Environment Agency requires the collection and consideration of further evidence, and if necessary the provision of additional mitigation measures, prior to confirming the conclusion of WFD compliance for this option.

Multi-obj_FP programme

This programme includes the same small groundwater options with WFD uncertainties as the Least Cost Programme and the same WFD compliance uncertainties of flow support elements for a supported Severn-Thames Transfer option as the Multi-obj_RES programme.

However, this programme also includes options with potential WFD compliance effects on the estuarine Thames Tideway. The Beckton Reuse (300 Ml/d) option as well as cumulative effects with the Beckton Desalination (150 Ml/d) option would directly influence freshwater flow into the middle Thames Tideway at a sensitive location for salinity ingress to the middle Thames Tideway and could therefore have inherent effects on water quality and supported ecology. A cumulative threshold volume of 275-365 Ml/d of desalination and/or water reuse schemes at which salinity issues may arise is indicative only and requires further study and analysis to confirm its validity. It is considered that this scale of freshwater reduction (450 Ml/d) could lead to salinity regime changes in the middle Tideway and the Multi-obj_FP programme may therefore not comply with WFD objectives for the ecology of the transitional water body. Further baseline understanding and site environmental investigations of the salinity regime of the middle Tideway would be required to better understand these patterns, along with improved evidence of the salinity sensitivity of certain aquatic species.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

NearO_RES programme

This programme includes the same small groundwater options with WFD uncertainties as the Least Cost programme and the same WFD compliance uncertainties of support elements for a supported Severn-Thames Transfer option as the Multi-obj_RES programme.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

NearO_TP programme

There are no programme level WFD effects, either from individual schemes or in-combination, for this programme.

Min_IGEQ programme.

This programme includes the same small groundwater options with WFD uncertainties as the Least Cost programme.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

Conclusions

In summary, the preferred programme is considered compliant with the WFD objectives of the relevant water bodies, now and in the future, as no WFD non-compliance has been identified. In the preferred programme, there is currently one compliance uncertainty relating to the Epsom groundwater (removal of constraints) option, but with further site-specific investigations and application of any required mitigation measures, this scheme will be WFD compliant. The preferred programme has fewer uncertainties than the Least Cost programme or the Min_IGEQ programme, but noting that the NearO_TP programme is confirmed as WFD compliant without any uncertainty. Of the remaining “reasonable alternative” programmes considered, each contain significant uncertainty for larger elements. For the Multi-obj_RES, Multi-obj_FP and NearO_RES programmes, the additional material uncertainty relates to the Minworth effluent transfer element of a supported Severn-Thames Transfer option. Thames Water and the Environment Agency consider that this option requires a significant programme of additional evidence collection and assessment prior to the consideration of additional mitigation measures to deliver WFD compliance. The additional potential WFD compliance effects in the estuarine Thames Tideway from the Multi-obj_FP programme makes this programme unfavourable in respect to WFD compliance uncertainties when compared to the other alternative programmes.

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1. Introduction

1.1 Background and Purpose of Report

Water companies in England and Wales have a statutory requirement to prepare a Water Resources Management Plan (WRMP) every five years; the Thames Water draft WRMP 2019 (WRMP19) was submitted to the Secretary of State on 1 December 2017 and approval was given to publish the draft plan for public consultation during early 2018.

Various comments were received by Thames Water on the draft WRMP19 during the consultation period. These are set out in the Statement of Response published on the Thames Water website alongside Thames Water's response and a summary of the consequent changes made to this WFD Assessment Report. Thames Water's responses to the consultation comments in relation to the WFD assessment, and the updated information are presented in this report. The assessments has been informed by further dialogue with the Environment Agency, and with other interested stakeholders, during spring and summer 2018.

This updated WFD Assessment report supports the development of the WRMP19.

This WRMP19 also informs the regulatory water company business planning Price Review process, through which the Water Services Regulation Authority (Ofwat) sets the prices that water companies can charge their customers for water (and wastewater) services. The next Price Review will be in 2019 (PR19) and Thames Water submitted its PR19 Business Plan to Ofwat in September 2018.

In the Water Resources Planning Guideline[1] (WRPG), the Environment Agency sets out the requirement for a water company to demonstrate the compliance of its WRMP with the EU Water Framework Directive (WFD).

The WFD compliance assessment is being undertaken in parallel with, and is being used to inform, the Strategic Environmental Assessment (SEA) and Habitats Regulation Assessment (HRA) of the WRMP19 to ensure an integrated approach to environmental assessment such that environmental considerations are integral to the development of the WRMP.

This report includes an assessment of WFD compliance for the constrained list of option elements, the preferred programme and its alternatives for the WRMP.

1.2 WFD Requirements for Water Resource Management Plan

The requirements for a WFD compliance assessment of a water company WRMP are explained in the 2016 Water Resources Planning Guideline (Box 1).

Box 1: WRPG 2018
Water Framework Directive Assessment of a WRMP
(Section 6.11 Water Framework Directive)

"You must take account of the requirements of the WFD, including the legally binding environmental objectives in the river basin management plans, when considering your proposed solution(s). You should consider solutions that promote the requirements of Article 4.1 of WFD (that seeks, as a minimum, to prevent deterioration of water with the aim of reducing the treatment needed to produce drinking water) and look to work in partnership with others. You should review solutions that have been identified in RBMP and this may require partnership working with others in the catchment to achieve the solution.

You should confirm that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option. In addition, you should ensure that any options do not prevent the achievement of good status (or potential). You should

[1] Environment Agency and Natural Resources Wales (2018) Water Resources Planning Guideline. Interim Update. July 2018.

talk to the Environment Agency or Natural Resources Wales about any intended actions that may cause deterioration of status (or potential) or prevent the achievement of the water body status objectives in the river basin management plans or for new modifications the achievement of good status (or potential). You should do this as soon as possible before developing your plan and you should make a clear statement in your plan about any potential impacts.

Your plans should include targeted and cost-effective implementation of restoration measures required at the catchment scale, either working solely or in partnership with other catchment based organisations. Given the uncertainty over the level of confidence you should consider the principles of adaptive management, with associated pre and post project monitoring."

These WRPG requirements reflect Defra's Guiding Principles for Water Resources Planning[2] (May 2016) which state that companies should take account of the government's objectives for the environment "including the appropriate parts of the EU Water Framework Directive". Defra also expects that companies will:

- Have regard to River Basin Management Plans (RBMPs) and their objectives when making decisions that could affect the condition of the water environment
- Ensure that current abstractions and operations, as well as future plans, support the achievement of environmental objectives and measures set out in RBMPs
- Ensure plans:
  - prevent deterioration in water body status
  - support the achievement of protected area and species objectives
  - support the achievement of water body status objectives
- Continue working with the Environment Agency to take a proportionate and evidence-based approach to identify the changes needed to current abstraction licences to meet environmental requirements.

Both the WRPG and the Defra Guiding Principles refer to ensuring 'no deterioration' of water body status. The European Court of Justice (ECJ) ruling[3] in 2015 clarified that 'no deterioration' in relation to the WFD means a deterioration between a whole 'status class' (e.g. 'good', 'moderate', etc.) of one or more of the relevant 'quality elements' (e.g. biological, physico-chemical, etc.). This definition applies equally to Artificial Water Bodies and Heavily Modified Water Bodies in respect of the relevant quality elements that relate to the defined uses of these water bodies. The ECJ ruling further states that if the quality element concerned is already in the lowest class, any deterioration of that element constitutes a deterioration of the status.

References to 'no deterioration' in this WFD assessment align to this ECJ ruling.

1.3 Structure of the Report

The report is divided into the following sections:

Section 1:	Introduction
Section 2:	WFD Assessment Approach
Section 3:	Summary of Option Element WFD Compliance Assessment
Section 4:	Summary of Option Level WFD Compliance Assessment, for those Options Selected in "Reasonable Alternative" WRMP Programmes
Section 5:	WFD compliance statement of the Preferred Programme
Section 6:	In-combination Assessment of WFD Compliance of the Thames Water WRMP19 Preferred programme with those of other Water Companies.
Section 7:	WFD compliance review of WRMP19 "Reasonable Alternative" Programmes

[2] Defra (2016) Guiding Principles for Water Resources Planning. May 2016.

[3] ECJ Case C‑461/13: Bund für Umwelt und Naturschutz Deutschland v Bundesrepublik Deutschland http://curia.europa.eu/juris/document/document.jsf?docid=178918&mode=req&pageIndex=1&dir=&occ=first&part=1&text=&doclang=EN-&cid=175124 [accessed 30.6.16]

2. WFD Assessment Approach

2.1 Methodology

As part of the development of the options being considered for its WRMP19, Thames Water carried out a WFD compliance assessment of all supply-side options contained within the "constrained list" of option elements.

This document outlines the approach adopted and reports the findings from the WFD compliance assessment of the constrained list options and a range of alternative programmes, as well as the WRMP19 preferred programme. The assessment involves the consideration of the likely impacts of both construction and operation of each option element on WFD requirements, in particular consideration of whether there is a risk of deterioration of water body status between status class of any WFD element. The methodology, set out below, was subject to consultation with the Environment Agency in summer 2016 as set out in Section 2.3 below.

2.1.1 Sequential Steps

A sequential six-stage process for undertaking WFD compliance assessments has been applied in line with the methodology published by Thames Water in 2016, as illustrated in Figure 2.1.

The six sequential steps are:

1. WFD compliance assessment screening: a preliminary assessment of each option element included in the WRMP feasible list to identify if there is any risk of deterioration in WFD status or risk to achieving WFD objectives. For existing water resource sources, the Environment Agency and Thames Water have undertaken an assessment of their sustainability up to their fully licensed abstraction rates – that assessment has been used to inform the screening of WFD compliance. For new resource options this screening step is based on expert judgement taking account of existing available evidence. Where a risk is identified, the option element is subject to the WFD compliance assessment. This step of the assessment for each option element is reported in Appendix A.

2. Element level WFD compliance assessment: For ecological status this involves assessment of the likely changes to the supporting hydro-morphology or water quality occurring as a result of the construction or operation of the option element and the possible risks to WFD status of biological elements, at a water body scale. In addition, the potential effects on WFD chemical status and WFD protected areas are assessed. This step of the assessment is reported in Appendix B, and together with Step 1, is summarised in Section 3.

3. Option level WFD compliance assessment: Where options are selected within the set of programmes, their individual elements have been consolidated into options. This includes both consolidating the water body scale WFD compliance assessments of each of the individual elements (from Steps 1 and 2) and considering whether there are cumulative impacts on a water body from the elements that comprise the option. This step of the assessment is reported in Appendix C and summarised in Section 4.

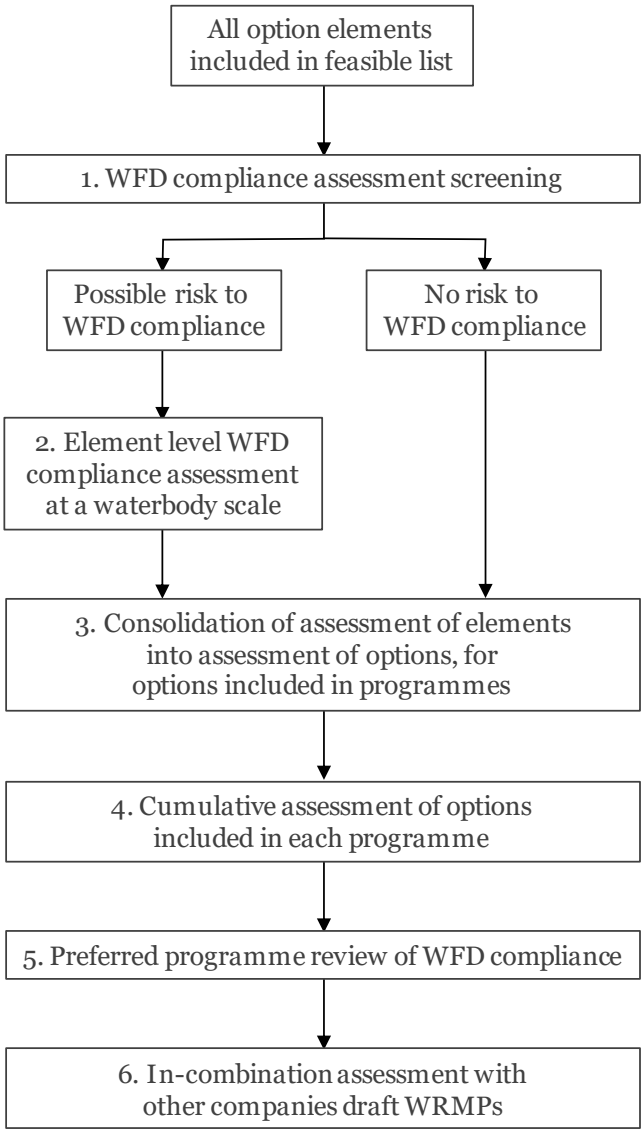
4. Programme level WFD compliance assessment: This involves assessment of the set of options within each reasonable alternative programme, both alone and in combination with other options within the programme. Each alternative programme is assessed separately. The alone assessment is a consolidation of the option level assessments from Step 3. That assessment is also used to identify where multiple options potentially impact on the same WFD water body, with a re-assessment of the cumulative assessment on that water body, and potentially downstream water bodies where appropriate. This step of the assessment is reported in Appendix D and Section 5.

5. Preferred programme WFD compliance statement. This involves a statement of the compliance of the preferred programme against each of the WFD compliance objectives set out in Section

2.1.2 below. Commentary is also provided on the WFD compliance of each of the alternative programmes. This step of the assessment is reported in Section 5.

6. In-combination assessment of the preferred programme with the latest available information of other water companies developing WRMP19s. An in-combination assessment has been included for the WRMP19 based on the latest available information (August 2018), primarily drawn from collaborative work prepared by the Water Resources South East Group. It is noted that options promoted through the WRMP may interact with options included within the Thames Water Drought Plan, with potential changes to the effectiveness of the drought measure or the environmental impact. Where there are potential changes to the Drought Plan, these would be updated as part of the cycle of Drought Plan updates at the time that the WRMP option is implemented, either by changing the suite of drought measures or changing the environmental baseline for assessing the environmental effects of the drought measure.

Figure 2.1 WRMP WFD compliance assessment steps



2.1.2 Environmental Objectives of the WFD

Fundamental environmental objectives of the WFD are to attain good ecological status and prevent deterioration of the status of water bodies. These objectives are set out in Article 4 of the WFD. Any new development (as well as existing operations) must ensure that these WFD objectives are not compromised. Article 4 on environmental objectives has been interpreted and further developed in EA

(2016)[4], Defra/EA (2009)[5], DoE NI (2012)[6] and WRPG (2018) to give a series of objectives to test in the WFD assessment. Based on these, the following are set out as objectives to test for in the WFD compliance assessment:

Objective 1: To prevent deterioration between WFD status classes of any water body
Objective 2: To prevent the introduction of impediments to the attainment of 'Good' WFD status or potential for the water body. It is noted that for some water bodies, it is accepted that achievement of Good status or potential is currently technically infeasible or disproportionately costly. Where this is the case, the test is applied to the currently agreed objectives for that water body rather than against Good status/potential.
Objective 3: To ensure that the planned programme of measures in the 2nd cycle of RBMPs (RBMP2) to help attain the WFD objectives for the water body (or the environmental objectives in the RBMP2) are not compromised
Objective 4: To ensure the achievement of the WFD objectives in other water bodies within the same catchment are not permanently excluded or compromised.

Two further objectives are to review and document if the option element assists the meeting of WFD objectives, which is in addition to the test of WFD compliance of the option element:

Objective 5: To assist the attainment of the WFD objectives for the water body
Objective 6: To assist the attainment of the objectives for associated WFD protected areas.

Objective 5 has been added to indicate whether the option element assists with attaining WFD water body objectives, acknowledging that no water resource scheme is under any obligation to do so. Objective 6 has been added based on the specific requirement of the WRPG. A "negative" answer to testing of Objectives 5 or 6 does not indicate that the option has an adverse WFD compliance assessment but does inform the assessment of that option element relative to other option elements.

2.2 Supporting Information and Data Used

Information on the design, construction and operation of the option elements was obtained from the relevant Thames Water conceptual design reports. The WFD status and water body information has been obtained from the Environment Agency (2016)[7] online Catchment Viewer for RBMP2 for the year 2015[8]. Water body protected areas linkages were also obtained from the Catchment Viewer, these include:

- Bathing Water Directive: Bathing waters
- Drinking Water Directive: Drinking water protected area
- Conservation of Wild Birds Directive: water dependent Special Protection Areas (SPAs)
- Habitats Directive: water dependent Special Areas of Conservation (SACs)
- Shellfish Directive[9]: Shellfish waters
- Nitrates Directive: Nitrate Vulnerable Zones

4 EA (2016) Protecting and improving the water environment – Water Framework Directive compliance of physical works in rivers. Doc No. 488_10.
5 Defra/EA (2009) WFD Expert Assessment of Flood Management Impacts. Joint Defra/ EA Flood and Coastal Erosion Risk Management R&D Programme. R&D Technical Report FD2609/TR. Report prepared by Royal Haskoning.
6 Department of the Environment Northern Ireland (2012) Carrying Out a Water Framework Directive (WFD) Assessment on EIA Developments. A Water Management Unit Guidance Note. March 2012
7 Environment Agency (2016) WFD Status for RBMP2 for the year 2015. Available from http://environment.data.gov.uk/catchment-planning/. New version released 31/03/2016. Accessed 07/10/2016.
8 Note 2015 is the appropriate reporting year for RBMP2, representing the status of each water body as reported to the EU by Defra for RBMP2. The EA also provide annual updates on status of each element in each water body, but these are not the published status of the water body.
9 The Shellfish Directive 2006/113/EC was repealed by the Water Framework Directive 2000/60/EC in 2013. The shellfish waters protected areas are waters designated by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The aim is to protect and improve water quality, to support the growth of healthy shellfish (bivalve and gastropod molluscs) and contribute to good quality edible shellfish. Note Shellfish Directive remains how this information is reported in the Environment Agency's Catchment Viewer.

- Urban Waste Water Treatment Directive: Nutrient sensitive area or eutrophication sensitive area.

2.3 Consultation

Extensive consultation has been carried out as part of the overall WRMP19 planning process with government, regulators, stakeholders and customers. The WFD compliance assessment methodology, was issued for consultation to the Environment Agency and wider stakeholders in summer 2016[10]. Comments were received from the Environment Agency[11] with responses issued by Thames Water[12].

Thames Water also held a series of regulatory consultation meetings between 2015 and 2017 on specific potential options, including associated WFD issues. Meetings were additionally held on the Severn to Thames Transfer option involving Natural England and Environment Agency, on the Vyrnwy river regulation support option with Environment Agency and Natural Resources Wales and the Teddington Direct River Abstraction option with Environment Agency and Natural England (amongst others). Comments and feedback from the regulatory bodies on the WFD issues for each of these options were used to inform the assessments presented in the WFD report accompanying the draft WRMP19.

Following publication of the draft WRMP19 for consultation in early 2018, various comments have been received by Thames Water on the draft WRMP19 WFD assessments. These are set out in the Statement of Response published on the Thames Water website alongside Thames Water's response and a summary of the consequent changes made to this WFD Report. The revised draft WRMP19, including the revised WFD Assessment Report, was published for consultation in autumn 2018. Various comments have been received from a range of stakeholders by Thames Water on the revised draft WRMP19 WFD assessment. These are set out in the second Statement of Response published on the Thames Water website together with Thames Water's response summarising the consequent changes made to the WFD Assessment Report.

Thames Water's response to the WFD comments and the updated information presented in this report has been informed by further dialogue with the Environment Agency, and with other interested stakeholders, during spring and summer 2018, in particular in relation to the Teddington DRA scheme. As a result of this further consultation with the Environment Agency, Thames Water has concluded that the WFD issues relating to temperature effects of the Teddington DRA scheme cannot reliably be mitigated to prevent the risk of WFD deterioration. Consequently, this scheme has been removed as an option from the Feasible List for the WRMP19. For completeness, the WFD compliance assessment of the Teddington DRA scheme taking account of the current mitigation measures discussed with the Environment Agency is presented in Appendix E.

Discussions have also been held since publication of the draft WRMP19 with Natural Resources Wales (NRW) in respect of the Vyrnwy Reservoir flow support options for the Severn-Thames transfer scheme in light of comments raised by NRW in its representation on the draft WRMP19. Following the discussions, we have identified the need for further site-specific environmental surveys/investigations in respect of the possible effects on WFD compliance in the Afon Vyrnwy water bodies, and if necessary the consideration of additional mitigation measures.

Discussions have also been held since the publication of the revised draft WRMP19 with the Environment Agency in respect of the flow, water quality and ecological effects of the Deephams Reuse scheme in light of comments raised by the Environment Agency in its representation on the revised draft WRMP19. Following these discussions, we have scoped out further supporting environmental investigations to confirm the WFD compliance of this option in the lower freshwater River Lee and the tidal systems it contributes to and if necessary the consideration of additional mitigation measures. The scope of the environmental investigations is summarised in Section 11 of the WRMP19.

Discussions have also been held since publication of the revised draft WRMP19 with the Canal & River Trust and the Environment Agency in respect of the potential flow, water quality and ecological effects

10 Thames Water (2016). Water Framework Directive Assessment Methodology for the Thames Water 2019 Water Resources Management Plan. Issued 8 July 2016.
11 Email from Sarah Wardell (Environment Agency) to Lesley Tait (Thames Water) 18 July 2016
12 Email from Lesley Tait (Thames Water) to Sarah Wardell (Environment Agency) 31 August 2016

of source water abstraction and in-river conveyance of the 15Ml/d Oxford Canal Transfer to Cropredy scheme in light of comments raised by the Environment Agency in its representation on the revised draft WRMP19. Following these discussions, we have scoped out further supporting environmental investigations to confirm the WFD compliance of this option in the Birmingham aquifers and connected surface waters as well as in the River Cherwell, and if necessary the consideration of additional mitigation measures. The scope of the environmental investigations is summarised in Section 11 of the WRMP19.

3. Summary of Option Element WFD Compliance Assessment

This section presents a summary of the option element level WFD compliance assessment for all option elements included in the constrained list. This is presented in Table 3.1 below. It is a summary of methodological Steps 1 and 2. The summary includes those option elements screened as without risk of deterioration in WFD status (Objective 1) and without risk to achieving WFD objectives (Objectives 2 and 3) (as identified in Appendix A). For those option elements screened in to assessment by Step 1, the results of the assessment of those option elements in Step 2 as assessed in Appendix B is also included.

Table 3.1 Option element WFD compliance assessment summary

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
Conveyance: Raw Water System	KGV Res intake capacity increase	CON-RWS-KGV-360	Compliant	-
Conveyance: Raw Water System	Queen Mary Res to Kempton WTW - 800Ml/d	CON-RWS-QMR-KEM	Compliant	-
Conveyance: Raw Water System	TLT capacity enhancement – up to 450Ml/d	CON-RWS-TLT	Compliant	-
Conveyance: Raw Water System	Datchet intake capacity increase	CON-RWS-DAT	Compliant	-
Conveyance: Raw Water System	Littleton Intake Capacity increase transfers to Queen Mary	CON-RWS-LTN-300	Compliant	-
Conveyance: Raw Water Transfer	Raw Water Transfer Deerhurst to Culham 300 Ml/d	CON-RWT-DEH-CLM-300	Compliant	-
Conveyance: Raw Water Transfer	Raw Water Transfer Deerhurst to Culham 400 Ml/d	CON-RWT-DEH-CLM-400	Compliant	-
Conveyance: Raw Water Transfer	Raw Water Transfer Deerhurst to Culham 500 Ml/d	CON-RWT-DEH-CLM-500	Compliant	-
Conveyance: Reuse	Reuse Beckton to Lockwood 300 Ml/d	CON-RU-BEC-LCK	Compliant	-
Conveyance: Raw Water System	TLT extension from Lockwood to KGV - 800Ml/d	CON-RWS-LCK-KGV-800	Compliant	-
Conveyance: Reuse	Reuse Deephams to new TLT extension	CON-RU-DPH-TLT EX	Compliant	-
Conveyance: Reuse	Reuse Deephams to KGV intake	CON-RU-DPH-KGV	Compliant	-
Network: Desalination	Desalination North Beckton to Coppermills 150 Ml/d	NET-DES-BEC-COP	Compliant	-
Network: Desalination	Desalination South Crossness to Beckton 300 Ml/d	NET-DES-CRO-BEC	Compliant	-
Network: TWRM	TWRM extension - Hampton to Battersea link	NET-TWRM-HAM-BAT	Compliant	-

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
Network: TWRM	TWRM extension - Coppermills to Honor Oak	NET-TWRM-COP-HON	Compliant	-
Network: TWRM	TWRM extension - Coppermills New Header tank	NET-TWRM-COP-HEA	Compliant	-
Network: TWRM	TWRM extension - Riverhead Pump Replacement	NET-TWRM-NRV-PUM	Compliant	-
Network: TWRM	TWRM extension - Barrow Hill Pump Replacement	NET-TWRM-BAR-PUM	Compliant	-
Network: TWRM	New Shaft at Kempton	NET-TWRM-KEM	Compliant	-
Resource: Inter-Company Transfers	SEW to GUI 10 Ml/d (Hogsback-Mount)	RES-ICT-SEW-GUI-MNT-10	Compliant	-
Resource: Aquifer Recharge	South London Artificial Recharge Scheme (SLARS) – Kidbrooke	RES-AR-SLARS1-7	Compliant	-
Resource: Aquifer Recharge	AR Merton (SLARS3) - 5 Ml/d	RES-AR-SLARS3	Compliant	-
Resource: Aquifer Recharge	AR Streatham (SLARS2) - 4 Ml/d	RES-AR-SLARS2	Compliant	-
Resource: Aquifer Storage & Recovery	ASR South East London (Addington) - 3 Ml/d	RES-ASR-SEL	Compliant	-
Resource: Aquifer Storage & Recovery	ASR Thames Valley/Thames Central - 1 Ml/d	RES-ASR-TV	Compliant	-
Resource: Desalination	Desalination North Beckton RO Treatment Plant 150 Ml/d	RES-DES-BEC	Compliant	-
Resource: Desalination	Desalination South Crossness RO Treatment Plant 100 Ml/d	RES-DES-CRO	Uncertain	Potential deterioration risk from changes in salinity in water body GB530603911402 (Thames Middle) during a third implementation phase of this option. Further understanding of effect required.
Resource: Groundwater	Groundwater Mortimer disused source (recommission) - 4.5 Ml/d	RES-GW-MOR	Compliant	-
Resource: Groundwater	Groundwater London confined Chalk (north) - 2 Ml/d	RES-GW-LCC	Compliant	-
Resource: Groundwater	Groundwater Southfleet/ Greenhithe (new WTW) - 8 Ml/d	RES-GW-SOU	Compliant	-
Resource: Groundwater	Groundwater Dapdune Licence	RES-GW-DAP	Compliant	-

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
	Disaggregation - 2.2 Ml/d			
Resource: Groundwater	Groundwater Addington - 1 Ml/d	RES-GW-ADD	Compliant	-
Resource: Groundwater	Groundwater - Moulsford 1.0 - 3.5 Ml/d	RES-GW-MOU	Compliant	-
Resource: Recommissioning Groundwater	Recommissioning Groundwater Merton	RES-RC-MTN	Compliant	-
Resource: Inter-Company Transfers	Inter-Company Transfer - Wessex Water to SWOX 2.9 Ml/d (Flaxlands)	RES-ICT-WES-FLX	Compliant	-
Resource: Inter-Zonal Transfers	Henley to SWOX 2.37 Ml/d	RES-IZT-HEN-SWX-NET-2.37	Compliant	-
Resource: Raw water transfer support	Raw Water Transfer Upper Severn Vyrnwy 180 Ml/d (Lon only)	RES-RWTS-VYR	Compliant	Provisional assessment of compliant with further work ongoing to confirm mitigation measures
Resource: Raw water transfer support	Raw Water Transfer Mythe 15 Ml/d (Lon only)	RES-RWTS-MYT	Compliant	-
Resource: Removal of Constraints	RC Datchet Main Replacement - 9.3 Ml/d	RES-RC-DAT	Compliant	-
Resource: Removal of Constraints	RC Ashton Keynes borehole pumps - 2.5 Ml/d	RES-RC-ASH	Uncertain	Potential risk of deterioration to river water body (River Churn (GB106039029750)) linked to likely groundwater drawdown of GB40601G600400 (Burford Jurassic) – further investigation planned and mitigation may be needed
Resource: Removal of Constraints	RC East Woodhay borehole pumps - 2.1 Ml/d	RES-RC-EWO	Compliant	-
Resource: Removal of Constraints	RC Dapdune - removal of constraints to DO - 3.2 Ml/d	RES-RC-DAP	Compliant	-
Resource: Removal of Constraints	Eton - removal of constraints to DO - 1.3 Ml/d	RES-RC-ETN	Compliant	-
Resource: Removal of Constraints	Ladymead WTW - removal of constraints to DO - 7.8 Ml/d	RES-RC-LAD	Compliant	-
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 150Mm^3	RES-RRR-ABI-150Mm^3	Compliant	-
Resource: Reservoir	New Reservoir South East	RES-RRR-ABI-125Mm^3	Compliant	-

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
	Strategic Reservoir Option 125Mm^3			
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 100Mm^3	RES-RRR-ABI-100Mm^3	Compliant	-
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 75Mm^3	RES-RRR-ABI-75Mm^3	Compliant	-
Resource: Reservoir	South East Strategic Reservoir Option 30+100Mm^3 Phase 1	RES-RRR-ABI-30+100Mm^3-P1	Compliant	-
Resource: Reservoir	South East Strategic Reservoir Option 30+100Mm^3 Phase 2	RES-RRR-ABI-30+100Mm^3-P2	Compliant	-
Resource: Reservoir	South East Strategic Reservoir Option 80+42Mm^3 Phase 1	RES-RRR-ABI-80+42Mm^3-P1	Compliant	-
Resource: Reservoir	South East Strategic Reservoir Option 80+42Mm^3 Phase 2	RES-RRR-ABI-80+42Mm^3-P2	Compliant	-
Resource: Reuse	Reuse Beckton 100 Ml/d	RES-RU-BEC-100	Compliant subject to further investigations	Further investigations required to confirm conclusions.
Resource: Reuse	IPR Reuse Beckton 100 Ml/d x 3 phases to get 300 Ml/d	RES-RU-BEC-100	Uncertain	Potential deterioration risk from changes in salinity in water body GB530603911402 (Thames Middle) during phase 3 of option. Further understanding of effect required.
Resource: Reuse	Reuse Beckton 150 Ml/d	RES-RU-BEC-150	Compliant	-
Resource: Reuse	Reuse Deephams 46.5 Ml/d	RES-RU-DPH	Compliant subject to further investigations	Further investigations required to confirm conclusions.
Treatment: London	Kempton WTW new 100 Ml/d	WTW-LON-KEM-100	Compliant	-
Treatment: London	Kempton WTW new 150 Ml/d	WTW-LON-KEM-150	Compliant	-
Treatment: London	Kempton WTW new 300 Ml/d	WTW-LON-KEM-300	Compliant	-
Treatment: London	Coppermills WTW extension 100 Ml/d	WTW-LON-COP-100	Compliant	-
Treatment: London	Coppermills WTW extension 150 Ml/d	WTW-LON-COP-150	Compliant	-
Treatment: SWOX	South East Strategic Reservoir Option WTW new 24 Ml/d (SWOX)	WTW-SWOX-ABI	Compliant	-
Treatment: SWOX	Radcot WTW new 24 Ml/d (SWOX)	WTW-SWOX-RAD	Compliant	-

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
Conveyance: Raw Water System	Medmenham Intake – 80Ml/d SWA South	CON-RWS-SWA-MMM	Compliant	-
Treatment: SWA	Medmenham WTW – 24Ml/d SWA South	WTW-SWA-MMM	Compliant	-
Conveyance: Raw Water System	Conveyance from Break Tank to Coppermills via Res 5 – (Spine 2)	CON-RWS-BT-COP-800	Compliant	-
Conveyance: Raw Water System	RWS_Surbiton intake capacity increase	CON-RWS-SUR-100	Compliant	-
Conveyance: Raw Water System	Chingford South intake capacity increase	CON-RWS-CHS-PS-100	Compliant	-
Conveyance: Raw Water System	KGV to BPT south of William Girling - 300Ml/d	CON-RWS-KGV-BT-300	Compliant	-
Treatment: SWOX	SWA north: South East Strategic Reservoir Option - SWA WTW (24Ml/d)	WTW-SWOX-ABI-SWA	Compliant	-
Network	SWA north: South East Strategic Reservoir Option treated water transfer to SWA	NET-IZT-AB-LC-72	Compliant	-
Resource: Raw water transfer support	Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 148 Ml/d	RES-RWTS-VYR-148	Compliant	Provisional assessment of compliant with further work required to confirm any required mitigation measures
Resource: Raw water transfer support	Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 60 Ml/d	RES-RWTS-VYR-60	Compliant	Provisional assessment of compliant with further work required to confirm any required mitigation measures
-	Didcot	RES-DRA-DID	Compliant	-
Resource: Raw water transfer support	Transfer of Minworth Effluent 115 Ml/d	RES-RWTS-MIN	Uncertain	Potential risk of deterioration to the ecology of River Avon (Warks) - conf R Sowe to conf R Leam (GB109054043840); further assessment is required to inform development of the mitigation measures necessary to deliver compliance and which may be challenging to achieve
Resource: Raw water transfer support	Netheridge Final Effluent Transfer	RES-RWTS-NTH	Complaint	-
Resource: Raw water transfer support	Vyrnwy Transfer to Severn Trent Water 12Ml/d	RES-RWTS-SHR-12	Compliant	-

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
Resource: Raw water transfer support	Vyrnwy Transfer to Severn Trent Water 30Ml/d	RWP_STT UU/ST OPT B	Compliant	-
Resource: Raw water transfer support	River Wye to Deerhurst 60 Ml/d	RES-RWTS-WYE-60.3	Compliant	Provisional assessment of compliant with further work required to confirm conclusions and determine whether additional mitigation measures are necessary to secure compliance
Conveyance: Raw Water systems	South East Strategic Reservoir Option to Farmoor 24 Ml/d	CON-RWS-ABI-FMR	Compliant	-
Conveyance: Raw Water Systems	Medmenham Raw water intake and transfer	CON-RWS-MMM-53	Compliant	-
Conveyance: Raw Water System	Oxford Canal - Farmoor 15	CON-RWS-OXC-FMR-15	Compliant	-
Network	Shalford to Netley Mill	NET-GUI-SFD-NML	Compliant	-
Resource: Aquifer Storage & Recovery	Horton Kirby	RES-ASR-HTK	Compliant	-
Resource: Groundwater	Groundwater Datchet 5.7 Ml/d	RES-GW-DAT	Compliant	-
Resource: Groundwater	Groundwater Honor Oak – 2.8 Ml/d	RES-GW-HON	Compliant	-
Network	SWA North: South East Strategic Reservoir treated water transfer to SWA	NET-IZT-AB-BS-48	Compliant	-
Resource: Inter-Zonal Transfers	Henley to SWA 2.37 Ml/d	RES-IZT-HEN-SWA-HAM-2.37	Compliant	-
Resource: Inter-Zonal Transfers	Henley to SWA 5 Ml/d	RES-IZT-HEN-SWA-HAM-5	Compliant	-
Resource: Inter-Zonal Transfers	Henley to SWOX 5 Ml/d	RES-IZT-HEN-SWX-NET-5	Compliant	
Resource: Inter-Zonal Transfers	Kennet Valley to SWOX 2.28 Ml/d	RES-IZT-KEN-SWX-2.3	Compliant	-
Resource: Inter-Zonal Transfers	Kennet Valley to SWOX 6.74 Ml/d	RES-IZT-KEN-SWX-6.7	Compliant	-
Resource: Removal of Constraints	Britwell - Removal of Constraints	RES-RC-BTW	Uncertain	Potential risk of deterioration to river water body (Chalgrove Brook (GB106039023740)) linked to likely groundwater drawdown of Vale of White Horse Chalk (GB40601G601000) – further investigation is planned and mitigation may be needed, which

Element Type	Element Name	Element Reference	Option Element WFD Compliance Assessment Summary	
			Summary	Reason, if not confirmed as compliant
				could be challenging to deliver
Resource: Raw water transfer support	Oxford Canal Transfer to Cropredy 15Ml/d	RES-RWTS-OXC-CRP-15	Compliant subject to further investigations	Further investigations required to confirm conclusions.
Resource: Raw water transfer support	Oxford Canal Transfer to Dukes Cut 15Ml/d	RES-RWTS-OXC-DKC-15	Compliant	-
Resource: Removal of Constraints	Epsom - Removal of Constraints	RES-RC-EPS	Uncertain	Potential risk of deterioration to river water body (Hogsmill River (GB106039017440)) linked to likely groundwater drawdown affecting GB106039017440 (Bromley Tertiaries) – further investigation planned and mitigation may be needed, e.g. further flow augmentation
Resource: Removal of Constraints	New River Head - Removal of Constraints – 3.45 Ml/d	RES-RC-NRV	Compliant	-
Resource: Raw water purchase	Chingford Raw Water Purchase	RES-RWP-CHD	Compliant	-
Resource: Reservoir	Culham to Farmoor	CON-RWS-CUL-FMR-180	Compliant	-
Conveyance	New Gauge - River Lee	TBC	Compliant	-
Conveyance	River Wye - Pann Mill	TBC	Compliant	-
Conveyance	River Wandle - Waddon	TBC	Compliant	-
Conveyance	River Cray - North Orpington	TBC	Compliant	
Network	SWA north: South East Strategic Reservoir Option treated water transfer to SWA	NET-IZT-AB-LC-48	Compliant	-

4. Summary of Option Level WFD Compliance Assessment, for those Options Selected in Reasonable Alternative WRMP Programmes

This section presents a summary of the Step 3 option level WFD compliance assessment for all options selected in any of the WRMP "reasonable alternative" programmes, as well as the preferred programme. This includes both consolidating the water body scale WFD compliance assessments of each of the individual option elements (from Steps 1 and 2) and considering whether there are cumulative assessments on a water body from the elements that comprise a particular option. The assessments are presented in Appendix C, noting these are assessments of individual options, not the alternative programmes.

The summary of the WFD compliance assessment of the selected options included in the reasonable alternative programmes. The options selected in the WRMP19 preferred programme are also identified in Table 4.1.

Table 4.1 Option-level WFD compliance assessment summary

Option	Option included in "reasonable alternative" programme or in the Preferred Programme						
	Phased_LC	Multi-obj_RES	Multi-obj_FP	NearO_RES	NearO_TP	Min_IGEQ	Preferred Programme
Aquifer Storage and Recovery (ASR) Horton Kirby	✓	✓	✓	✓		✓	✓
AR SLARS Kidbrooke (SLARS1) 7 Ml/d		✓	✓				✓
AR Streatham (SLARS2) 5 Ml/d	✓	✓	✓			✓	
AR Merton (SLARS3) 5 Ml/d	✓	✓	✓	✓		✓	✓
ASR South East London (Addington) 1 Ml/d	✓	✓	✓	✓			
ASR South East London (Addington) 3 Ml/d							✓
ASR Thames Valley/Thames Central 3 Ml/d	✓	✓	✓	✓		✓	
Beckton Desalination 150	✓		✓	✓	✓	✓	
Beckton Reuse 200 Ml/d (phased 100)		✓					
Beckton Reuse 300 Ml/d (phased 150)			✓				
Chalkstream pipelines							✓
Chingford Raw Water Purchase	✓	✓	✓	✓	✓	✓	✓
Coppermills WTW extension 100 Ml/d	✓	✓	✓	✓	✓	✓	✓
Culham to Farmoor 180 Ml/d							✓
Deephams Reuse	✓		✓	✓		✓	✓
Didcot Raw Water Purchase	✓	✓	✓	✓	✓	✓	✓
Groundwater Addington 1 Ml/d	✓	✓	✓	✓		✓	✓
Groundwater Dapdune							✓
Groundwater Datchet 6Ml/d	✓	✓	✓	✓		✓	✓
Groundwater London confined Chalk (north) 2 Ml/d	✓		✓	✓		✓	
Groundwater Moulsford 1 - 3.5 Ml/d	✓	✓	✓	✓		✓	
Groundwater Southfleet/Greenhithe (new WTW) 8 Ml/d	✓	✓	✓	✓		✓	✓
Honor Oak		✓				✓	
Kempton WTW new 100 Ml/d	✓	✓	✓	✓	✓	✓	✓
Medmenham intake to SWA	✓			✓	✓	✓	✓
Merton Recommissioning	✓	✓	✓			✓	✓
New River Head - Removal of Constraints	✓	✓	✓	✓		✓	✓
NTC_Dapdune							✓
NTC_Ladymead (+ Shalford to Albury transfer main)							✓
Oxford Canal to Cropredy Resource 15 Ml/d	✓	✓	✓	✓		✓	✓
RC Ashton Keynes borehole pumps 2.5 Ml/d	✓	✓	✓	✓		✓	
RC Britwell 1.31 Ml/d	✓	✓	✓	✓		✓	
RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	✓	✓	✓	✓		✓	✓
Severn-Thames Transfer				✓			
Severn-Thames Transfer 1							✓
Severn-Thames Transfer 2		✓					

Table 4.1 cont.

Option	Phased _LC	Option included in "reasonable alternative" programme					
		Multi-obj_RES	Multi-obj_FP	NearO_RES	NearO_TP	Min_IGEQ	Preferred Programme
Severn-Thames Transfer 3			✓				
South East Strategic Reservoir Option 125Mm^3	✓		✓				
South East Strategic Reservoir Option 150Mm^3		✓			✓	✓	✓
Wessex to SWOX (Flaxlands)	✓	✓				✓	
ITZ_North SWX to SWA 72		✓					
ITZ_North SWX to SWA 48			✓				

Seven options included within some of the "reasonable alternative" programmes are assessed as 'uncertain' in respect of the WFD compliance test following the assessment at the option level: the Beckton 300Ml/d reuse option, three of the groundwater removal of constraints options (Ashton Keynes, Britwell and Epsom) and the three variants of a Severn-Thames Transfer that include transfer of effluent from Minworth STW. The following paragraphs give an overview of these options, with the detail presented in Appendix C.

Beckton 300 Ml/d reuse option: There is a risk of impact on WFD status relating to the Thames Middle transitional water body. The second phase of this scheme (2 x 150 Ml/d reuse option) would reduce freshwater inputs below the lower value of an indicative impact threshold on salinity (275-365 Ml/d)[13]. Further reductions in freshwater input at this sensitive location for salinity ingress to the middle Thames Tideway could have inherent effects on water quality and supported ecology (saline-sensitive species). The threshold is indicative only and requires further site-specific studies and analysis to confirm its validity.

Ashton Keynes groundwater removal of constraints option: There is a risk of impact on WFD status relating to the River Churn (from Baunton to Cricklade) river water body linked to likely groundwater drawdown in the underlying Burford Jurassic groundwater water body. Further evidence is required to confirm the extent of hydraulic connectivity and the effect of increased abstraction from the aquifer. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. With an options appraisal and development of appropriate mitigation measures following these investigations, it is likely that the option would be WFD compliant. However, until this further assessment is undertaken, there is a level of uncertainty in WFD compliance associated with this option.

Britwell groundwater removal of constraints option: There is a risk of impact on WFD status relating to the Chalgrove Brook river water body linked to likely groundwater drawdown in the underlying Vale of White Horse Chalk groundwater water body. Further evidence is required to confirm the extent of flow reduction from increased groundwater abstraction and the linked effects on wetted habitat and dilution of nutrient pollution pressures and consequent effects on aquatic ecology. Options appraisal and development of appropriate mitigation measures for this option may be challenging without affecting the deployable output benefit of this option. Until further assessment is undertaken, there is an elevated level of uncertainty in WFD compliance associated with this option.

Epsom groundwater removal of constraints option: There is a risk of impact on WFD status relating to the Hogsmill River river water body linked to abstraction likely impacting the underlying Bromley Tertiaries groundwater water body. The extent of impact of the licence (including to maximum licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. Currently, impacts are mitigated by 3rd party flow augmentation of a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may require mitigation measures. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and if required an options appraisal, and would need to be agreed with the Environment Agency. With further assessment and development of appropriate mitigation

[13] Freshwater contributions and salinity effects as set out in the Feasibility Report.

measures, such as extension of the existing river flow augmentation scheme, the option is considered likely to be WFD compliant. However, until further assessment is undertaken, there is a level of uncertainty in WFD compliance associated with this option.

Severn-Thames Transfer, Severn-Thames Transfer 2 and Severn-Thames Transfer 3: There is a material risk of impact on the WFD status of the River Avon (from the confluence of the River Leam to Tramway Bridge, Stratford) river water body. This relates specifically to the transfer of Minworth Effluent (115 Ml/d) flow support element. Currently, there is a level of uncertainty surrounding the level of adverse impacts on the river's water quality and ecology and further site-specific environmental assessment is required to quantify this. With further assessment and development of appropriate mitigation measures, the option may be shown to be WFD compliant but there are some challenges remaining to achieve this conclusion with certainty.

As identified above and following further dialogue with NRW, it is noted that the Vyrnwy Reservoir flow support element of a Severn-Thames Transfer (a component part of all four Severn-Thames Transfer variants) requires the collection and consideration of further environmental evidence prior to confirming WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir to the Afon Tanat confluence. Additional mitigation measures may be required to protect these water bodies, particularly for the larger flow support option element variants. However, we have included in the costs of this option provision of a new pipeline to discharge water directly to the River Severn, should it not be possible to achieve WFD compliance for the Afon Vyrnwy water bodies. In this respect, the risks to WFD compliance can be addressed.

In addition, it is noted that the River Wye (on the England/Wales border) support element of a Severn-Thames Transfer (a component part of Severn-Thames Transfer and Severn-Thames Transfer 2 variants) requires the collection and consideration of further evidence prior to confirming WFD compliance in the River Wye water body from Hampton Bishop to Kerne Bridge. Should this element be included in the preferred programme, further investigation would be undertaken by the donor water company Dwr Cymru Welsh Water.

There is no risk of deterioration or adverse effect on water body status or objectives for any other WFD water bodies in relation to any of the other options when operating alone. Further details of the assessment process for other WFD water bodies are contained within Appendices A, B and C.

As identified above and following further dialogue with Environment Agency we have scoped out further supporting environmental investigations to confirm the assessment of WFD compliance of three options: Deephams Reuse; Beckton Reuse (~70Ml/d); and 15Ml/d Oxford Canal Transfer to Cropredy. Where necessary, additional mitigation measures may need to be considered as part of these further investigations. The scope of the environmental investigations is summarised in Section 11 of the WRMP19.

5. WFD compliance statement of WRMP19 preferred programme

This section tests the impacts of the preferred programme against the WFD objectives described in Section 2.1.2 and describes the WFD compliance statement for the preferred programme. The Step 5 detailed assessment of the WFD compliance for the preferred programme is presented in Appendix D. A review of the WFD compliance of each of the "reasonable alternative" programmes that were used to develop the preferred programme is included in Section 7.

The Preferred Programme comprises the following options (schemes) with their programmed commission-by dates. The constituent option elements are listed in Appendix C:

- Aquifer Storage and Recovery (ASR) Horton Kirby; 2024
- AR SLARS Kidbrooke (SLARS1) 7 Ml/d; 2030
- AR Merton (SLARS3) 5 Ml/d; 2031
- ASR South East London (Addington) 3 Ml/d; 2030
- "Chalk stream" pipelines (South East London; South West London; SWA; River Lee New Gauge); 2037
- Chingford Raw Water Purchase, 2035
- Coppermills WTW extension 100 Ml/d; 2055
- Culham to Farmoor (chalk streams) 180 Ml/d; 2037
- Deephams Reuse; 2030
- Didcot Raw Water Purchase; 2020
- Groundwater Addington 1 Ml/d; 2030
- Groundwater Dapdune; 2091
- Groundwater Datchet 6Ml/d; 2038
- Groundwater Southfleet/Greenhithe (new WTW) 8 Ml/d; 2024
- Kempton WTW new 100 Ml/d; 2075
- Medmenham intake to SWA; 2066
- Merton Recommissioning; 2030
- New River Head - Removal of Constraints; 2020
- NTC_Dapdune; 2081
- NTC_Ladymead (+ Shalford to Albury transfer main); 2024
- Oxford Canal to Cropredy Resource 15 Ml/d; 2030
- RC Epsom borehole pumps - 2.13 Ml/d (groundwater scheme); 2030
- Severn-Thames Transfer 1; 2083
- South East Strategic Reservoir Option 150Mm^3; 2037

Demand management options were screened out for WFD compliance assessment as no risks to WFD compliance were identified. The demand management programmes may have beneficial effects on WFD objectives by improving the local water environment and slowing the growth in demand for water.

In consideration of the six compliance assessment objectives, the WFD compliance assessment of Thames Water's WRMP19 Preferred Programme has concluded that:

Objective 1:
The Preferred Programme is considered compliant with WFD Objective 1 relating to water body deterioration risk, now and in the future, as no WFD non-compliance has been confirmed.

Based on current information available, it is not considered that the potential impacts of the Epsom groundwater removal of constraints option would be WFD non-compliant. It is identified, as set out in Appendix B, that this option could influence groundwater water body dependent surface water body test in the Bromley Tertiaries groundwater water body (potential impacts are to fish and macroinvertebrates in the Hogsmill River) and that there is a need for further investigation of the option because the information/data set is insufficient to be categorically sure about WFD compliance. The extent of impact

from increased abstraction at Epsom (but within licence capacity) will be subject to review of its sustainability under the WINEP in AMP7. In the event that further investigations indicate that there is a larger risk of WFD non-compliance than is currently assumed to be the case, then mitigation measures will be delivered, subject to options appraisal if required. Such mitigation could include an increase in flow augmentation at Ewell, although this is subject to the planned investigation and would need to be agreed with the Environment Agency following an options appraisal if required. With any required mitigation in place the scheme would be considered WFD compliant. However, should the planned investigation identify the option as not sustainable, or where the incorporating mitigation measures are considered not to be appropriate or effective, then the option programmed for operation in 2030 would be replaced with another option from the feasible list in the 2024 WRMP.

As set out in Appendix D, locally on the River Thames at Culham, Thames Water would manage in-combination abstractions for the South East Strategic Reservoir (from 2037), the Culham to Farmoor transfer (from 2037), regulating releases from the South East Strategic Reservoir (from 2037) and finally much later in the plan period, the supported Severn-Thames Transfer scheme (from 2083). Supporting environmental evidence has identified that the continuous nature of these discharges during low flow periods presents fewer risks to fish and aquatic invertebrates, albeit the cumulative magnitude of the flow increase would be to the indicative threshold identified. The Culham to Farmoor transfer and abstraction for a South East Strategic Reservoir Option would operate within licence conditions including hands-off flow conditions to protect low river flows and limit daily maximum abstraction rate. Combined operation would therefore modulate the flow regime of the River Thames, with reduced high flows or enhanced low flows regularly and for long periods. A combined operating strategy would be developed with regulators and other stakeholders to manage these effects in terms of the potential ecological impacts on the River Thames locally and downstream. A modulated flow regime would be most apparent until the next significant tributary, the River Thame, although modulation of the flow regime of downstream waterbodies cannot be ruled out at this stage. The in-combination effect with any reduction in upper Thames catchment groundwater abstractions and cessation of abstraction from the River Thames at Farmoor (during low flow periods, with the Culham to Farmoor transfer) would also need considering, noting that these would be flow-neutral in the River Thames downstream of Culham. Subject to development of an appropriate operating strategy the combined effect on the River Thames at Culham and downstream is assessed as WFD compliant.

As set out in Appendix C, the Vyrnwy support element of a Severn-Thames Transfer requires the collection and consideration of further evidence prior to confirming any necessary mitigation measures and WFD compliance in the Afon Vyrnwy downstream of Vyrnwy Reservoir.

Further supporting environmental investigations will be undertaken to confirm the assessment of WFD compliance of the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option. Where necessary, additional mitigation measures may need to be considered as part of these further investigations. The scope of the environmental investigations is summarised in Section 11 of the WRMP19.

The preferred programme is considered compliant with the WFD objectives of the relevant water bodies, now and in the future, as no WFD non-compliance has been identified. This will be confirmed through the collection of further evidence and the inclusion of additional mitigation measures where appropriate.

Objective 2:
None of the schemes included in the Preferred Programme, alone or in combination, have the potential to impede the achievement of WFD water body objectives. The Preferred Programme is therefore compliant with respect to Objective 2 of the WFD.

Objective 3:
None of the schemes in the Preferred Programme, alone or in combination, hinder the planned RBMP2 programme of measures to help attain WFD objectives for any water body. The Preferred Programme is therefore compliant with respect to Objective 3 of the WFD.

Objective 4:
None of the schemes in the Preferred Programme, alone or in combination, affect the WFD objectives

of other water bodies, beyond those uncertain risks listed above. The Preferred Programme is therefore neutral with respect to Objective 4 for the WFD.

Objective 5:
None of the schemes in the Preferred Programme, alone or in combination, can be confirmed to contribute positively to the attainment of good status or good potential objectives for any waterbodies. To date, the assessment of the potential environmental benefits of reducing or relocating abstraction made possible by the various “chalk stream” pipelines (Culham to Farmoor; South East London; South West London; SWA; River Lee New Gauge) have not been set out in terms of specific WFD benefits. However, these options will reduce abstraction pressures on sensitive chalk streams on aquatic ecology and therefore build aquatic ecology resilience. It is therefore considered that the Preferred Programme will be compliant with respect to Objective 5 for the WFD.

Objective 6:
None of the schemes in the Preferred Programme, alone or in combination, contribute to the attainment of objectives for WFD protected areas. The Preferred Programme is therefore neutral with respect to Objective 6 for the WFD.

6. In-combination Assessment of WFD Compliance of the Thames Water WRMP19 Preferred programme with those of other Water Companies

Table 6.1 presents the in-combination WFD assessment between the Thames Water WRMP19 and the preferred programmes of other water companies where potential in-combination effects have been identified.

Table 6.1 Summary of in-combination WFD compliance assessment of the Thames Water WRMP19 preferred programme with those of selected other water companies

WFD water body			Preferred Programmes (April 2020)										
Type	ID and name	River Basin District	Southern Water	Affinity Water	Severn Trent Water	Dŵr Cymru Welsh Water	United Utilities	Bristol Water	SES Water	South East Water	Wessex Water	Anglian Water	Essex & Suffolk Water
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames	-	✓	-	-	-	-	-	-	-	-	-
	GB106039030334 - Thames (Evenlode to Thame)	Thames	-	✓	-	-	-	-	-	-	-	-	-
	GB106039030331 - Thames (Wallingford to Caversham)	Thames	-	✓	-	-	-	-	-	-	-	-	-
	GB106039023233 - Thames (Reading to Cookham)	Thames	-	✓	-	-	-	-	-	-	-	-	-
	GB106039023231 – Thames (Cookham to Egham)	Thames	-	✓	-	-	-	-	-	-	-	-	-
	GB106039023232 – Thames (Egham to Teddington)	Thames	-	✓	-	-	-	-	-	-	-	-	-
	GB106039017440 - Hogsmill	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106039017630 - Wey (Shalford to River Thames confluence at Weybridge)	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106038027910 – Pymmes and Salmon Brooks – Deephams STW to Tottenham Locks	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106038027950 – Lea Navigation Enfield Lock to Tottenham Locks	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB109054049880 - Vyrnwy - Lake Vrynwy to conf Afon Cownwy	Severn	-	-	-	-	-	-	-	-	-	-	-
	GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy	Severn	-	-	-	-	-	-	-	-	-	-	-
	GB109054049852 - Afon Vyrnwy DS of Banwy confluence	Severn	-	-	-	-	-	-	-	-	-	-	-
	GB109054049800 - Afon Vyrnwy - conf Afon Tanat to conf R Severn	Severn	-	-	-	-	-	-	-	-	-	-	-
	GB109054044404 - Severn - conf R Avon to conf Upper Parting	Severn	-	-	-	-	-	-	-	-	-	-	-
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber	-	-	-	-	-	-	-	-	-	-	-
	GB104028046842 - Tame – conf two arms to R Rea	Humber	-	-	-	-	-	-	-	-	-	-	-
Lake	GB30641523 – King Georges Reservoir	Thames	-	-	-	-	-	-	-	-	-	-	-

WFD water body			Preferred Programmes (April 2020)										
Type	**ID and name**	**River Basin District**	Southern Water	Affinity Water	Severn Trent Water	Dŵr Cymru Welsh Water	United Utilities	Bristol Water	SES Water	South East Water	Wessex Water	Anglian Water	Essex & Suffolk Water
	GB30641659 – William Girling Reservoir	Thames	-	-	-	-	-	-	-	-	-	-	-
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB40601G500300 - North Kent Medway Chalk	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB40601G601000 - Vale of White Horse Chalk	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB40601G500500 – Kent Greensand Western	Thames	-	-	-	-	-	-	-	-	-	-	-
	GB40602G602300 - Bromley Tertiaries	Thames											
	GB40402G992400 - Tame Anker Mease – Coal Measures Black Country	Humber	-	-	-	-	-	-	-	-	-	-	-
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber	-	-	-	-	-	-	-	-	-	-	-

Key: All WFD water bodies identified in Thames Water preferred programme listed.
- indicates where other water company WRMPs Preferred Programme options do not affect same water body
✓ indicates where other water company WRMPs Preferred Programme options affect same water body

As seen from Table 6.1 following review of the latest available information (April 2020) in respect of other water company's WRMP19 preferred programmes, there is an option in the Affinity Water plan which affects the same water bodies as those considered for assessment of the effects of Thames Water's WRMP preferred programme.

The relevant option in Affinity Water's WRMP preferred programme is the same South East Strategic Reservoir option included in Thames Water's plan. This option would be jointly promoted by both water companies and the combined operation of the option is that set out within this WFD compliance assessment. Therefore, there are no further in-combination effects of this option with respect to WFD compliance.

No other in-combination adverse effects have been identified in relation to any other water companies' preferred WRMP19 programmes as available at April 2020.

7. WFD compliance review of WRMP19 "Reasonable Alternative" Programmes

Six "reasonable alternative" programmes were short-listed by Thames Water for WFD assessment (as well as for HRA and SEA):

- the least cost programme (Phased_LC)
- favouring intergenerational equity (Min_IGEQ)
- favouring resilience and cost equally (Multi-obj_RES)
- favouring customer preference for the frequency of restrictions and cost equally (Multi-obj_FP)
- favouring resilience with a programme cost restriction of 120% of least cost (NearO_RES)
- favouring customer preference for type of options with a programme cost restriction of 120% of least cost (NearO_TP)

Options included in each of these alternative programmes are presented in Table 7.1, together with the preferred programme for completeness. The Step 5 assessment of the WFD compliance for these "reasonable alternative" programmes is presented in Appendix D. This section tests the impacts of these programmes against the WFD objectives described in Section 2.1.2.

Table 7.1 Options included in the WRMP19 "reasonable alternative" programmes

Option	Phased_LC	Multi-obj_RES	Multi-obj_FP	NearO_RES	NearO_TP	Min_IGEQ
Aquifer Storage and Recovery (ASR) Horton Kirby	✓	✓	✓	✓		✓
AR SLARS Kidbrooke (SLARS1) 7 Ml/d		✓	✓			
AR Streatham (SLARS2) 5 Ml/d	✓	✓	✓			✓
AR Merton (SLARS3) 5 Ml/d	✓	✓	✓	✓		✓
ASR South East London (Addington) 1 Ml/d	✓	✓	✓	✓		
ASR Thames Valley/Thames Central 3 Ml/d	✓	✓	✓	✓		✓
Beckton Desalination 150	✓		✓	✓	✓	✓
Beckton Reuse 200 Ml/d (phased 100)		✓				
Beckton Reuse 300 Ml/d (phased 150)			✓			
Chingford Raw Water Purchase	✓	✓	✓	✓	✓	✓
Coppermills WTW extension 100 Ml/d	✓	✓	✓	✓	✓	✓
Deephams Reuse	✓		✓	✓		✓
Didcot Raw Water Purchase	✓	✓	✓	✓	✓	✓
Groundwater Addington 1 Ml/d	✓	✓	✓	✓		✓
Groundwater Datchet 6 Ml/d	✓	✓	✓	✓		✓
Groundwater London confined Chalk (north) 2 Ml/d	✓		✓	✓		✓
Groundwater Moulsford 1 - 3.5 Ml/d	✓	✓	✓	✓		✓
Groundwater Southfleet/Greenhithe (new WTW) 8 Ml/d	✓	✓	✓	✓		✓
Honor Oak		✓				✓
Kempton WTW new 100 Ml/d	✓	✓	✓	✓	✓	✓
Medmenham intake to SWA	✓			✓	✓	✓
Merton Recommissioning	✓	✓	✓			✓
New River Head - Removal of Constraints	✓	✓	✓	✓		✓
Oxford Canal to Cropredy Resource 15 Ml/d	✓	✓	✓	✓		✓
RC Ashton Keynes borehole pumps 2.5 Ml/d	✓	✓	✓	✓		✓
RC Britwell 1.31 Ml/d	✓	✓	✓	✓		✓
RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	✓	✓	✓	✓		✓
Severn-Thames Transfer				✓		
Severn-Thames Transfer 2		✓				
Severn-Thames Transfer 3			✓			
South East Strategic Reservoir Option 125Mm^3	✓		✓			
South East Strategic Reservoir Option 150Mm^3		✓			✓	✓
Wessex to SWOX (Flaxlands)	✓	✓				✓
ITZ_North SWX to SWA 72		✓				
ITZ_North SWX to SWA 48			✓			

7.1 Least cost alternative programme

As identified in Table 7.1, the least cost programme includes several small groundwater options for which there is currently insufficient evidence to fully assess the potential impacts, as set out in Section 4: Ashton Keynes, Epsom and Britwell. For the Ashton Keynes groundwater removal of constraints option, further evidence is required to confirm the extent of hydraulic connectivity and the effect of increased abstraction from the aquifer as part of planned WINEP investigations in AMP7. With an options appraisal and development of appropriate mitigation measures following these investigations, it is likely that the option would be WFD compliant. However, until this further assessment is undertaken, there is a level of uncertainty in WFD compliance associated with this option.

For the Epsom groundwater removal of constraints option, the extent of impact of the licence (including to maximum licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. Currently impacts are mitigated by 3rd party flow augmentation of a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may require mitigation measures. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and if required options appraisal, and would need to be agreed with the Environment Agency. With further assessment and development of appropriate mitigation measures, such as extension of the existing river flow augmentation scheme, the option is considered likely to be WFD compliant. However, until further assessment is undertaken, there is a level of uncertainty in WFD compliance associated with this option.

For the Britwell groundwater removal of constraints option, further evidence is required to confirm the extent of flow reduction from increased groundwater abstraction and the linked effects on wetted habitat and dilution of nutrient pollution pressures and consequent effects on aquatic ecology. Options appraisal and development of appropriate mitigation measures for this option may be challenging without affecting the deployable output benefit of this option. Until further assessment is undertaken, there is an elevated level of uncertainty in WFD compliance associated with this option.

For the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option, further supporting environmental investigations are required by the Environment Agency to confirm the assessment of WFD compliance.

7.2 Multi-obj_RES programme

As identified in Table 7.1, this programme includes the same small groundwater options as the least cost programme for which there is currently insufficient evidence to fully assess some of the potential impacts as described in Section 7.1.

The Minworth effluent transfer element of a supported Severn-Thames Transfer option carries a WFD compliance risk that requires further consideration. The effect on sanitary, nutrient and chemical water quality, as well as water temperature and consequently the aquatic ecology from mixing tertiary treated effluent into the River Avon downstream of Warwick, particularly under low river flow conditions in the River Avon, requires further assessment. At present, the ability to secure WFD compliance of this water body for this option remains a challenge and requires more extensive environmental investigations to assess the risk in more detail and, if necessary, develop additional mitigation measures to secure compliance, as set out in Section 4.

In addition, the Vyrnwy support element of a Severn-Thames Transfer option requires the collection and consideration of further evidence prior to confirming any additional mitigation measures necessary to secure WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir as set out in Section 4. However, we have included costs for this option to develop a pipeline to enable the flow support to be discharged directly from the reservoir to the River Severn, should the additional detailed survey evidence demonstrate that mitigation measures cannot secure WFD compliance.

This programme includes the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in Section 7.1.

7.3 Multi-obj_FP programme

As identified in Table 7.1 and set out in Appendix D, this programme includes the potential for programme level in-combination effects between the Beckton Reuse (300 Ml/d) option and the Beckton Desalination (150 Ml/d) option. These options directly influence freshwater flow into the middle Thames Tideway, with the Beckton Desalination (150 Ml/d) option programmed first (2065) followed by the larger Beckton Reuse option (2085). The cumulative effect of these two options from 2085 is a reduction in freshwater flows to the middle Tideway of around 450Ml/d, which is greater than the indicative impact threshold on salinity of 275-365 Ml/d[14]. Further reductions in freshwater input at this sensitive location for salinity ingress to the middle Thames Tideway could have inherent effects on water quality and supported (saline-sensitive) ecology. The threshold is indicative only and requires further study and analysis to confirm its validity. It is considered that this scale of freshwater reduction could lead to salinity regime changes in the middle Tideway and the Multi-obj_FP programme may not comply with WFD objectives for the ecology of the transitional water body. Further baseline understanding of the salinity regime of the middle Tideway would be required to better understand these patterns.

The programme also includes the same small groundwater options as the least cost programme for which there is currently insufficient evidence to fully assess the potential impacts as described in Section 7.1.

The Minworth effluent transfer element of a support Severn-Thames Transfer option is also included in this programme, and the WFD issues are the same as those set out in Section 7.2.

In addition, the Vyrnwy and River Wye (England/Wales border) support elements of a Severn-Thames Transfer option require the collection and consideration of further evidence prior to confirming any required mitigation measures to secure WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir (as set out in Section 7.2) and a reach within two water bodies of the River Wye as set out in Section 4.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in Section 7.1.

7.4 NearO_RES programme

As identified in Table 7.1, this programme includes the same small groundwater options as the least cost programme for which there is currently insufficient evidence to fully assess some of the potential impacts as described in Section 7.1.

The Minworth effluent transfer element of a support Severn-Thames Transfer option is also included in this programme, and the WFD issues are the same as those set out in Section 7.2.

This programme includes the Vyrnwy (England/Wales border) support elements of a Severn-Thames Transfer option with the same WFD issues as set out in Section 7.3

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in Section 7.1.

7.5 NearO_TP programme

There are no programme level alone or in-combination WFD effects for this programme.

7.6 Min_IGEQprogramme

As identified in Table 7.1, this programme includes the same small groundwater options as the least cost programme for which there is currently insufficient evidence to fully assess some of the potential impacts as described in Section 7.1.

[14] Freshwater contributions and salinity effects as set out in the Feasibility Report.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in Section 7.1.

APPENDIX A:
OPTION ELEMENT WFD COMPLIANCE ASSESSMENT SCREENING OUTCOMES (STEP 1)

Table 1 in this Appendix presents the results of the WFD compliance assessment screening outcomes for all of the option elements included in the WRMP19 feasible list and indicates whether they were screened in for a WFD compliance assessment based on the potential risk of deterioration of WFD status. The WFD compliance assessment for elements scoped in for assessment are presented in Appendix B. The table also identifies where the Environment Agency's Sustainable Catchments Programme has identified existing licences as sustainable or subject to investigation of sustainability in the WINEP, noting that the full existing abstraction licence capacity is included in that assessment.

Catchment management schemes and demand management options have been screened out for WFD compliance assessment; these options may have beneficial effects on WFD objectives by improving the local water environment through land-use management and reducing the growth in demand for water.

Table 1 WRMP19 Option Elements: Screening for risk of deterioration in WFD Status

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Conveyance: Raw Water System	KGV Res intake capacity increase	CON-RWS-KGV-360	Lea Navigation Enfield Lock to Tottenham Locks King Georges Reservoir	GB106038027950 GB30641523	River Lake	Y	-
Conveyance: Raw Water System	Queen Mary Res to Kempton WTW - 800Ml/d	CON-RWS-QMR-KEM	N/A	N/A	N/A	N	Pipeline element only. No likely impact on WFD water bodies during construction subject to good practice construction methods.
Conveyance: Raw Water System	TLT capacity enhancement – up to 450Ml/d	CON-RWS-TLT	N/A	N/A	N/A	N	Conveyance element only. No likely impact on WFD water bodies during construction subject to good practice construction methods.
Conveyance: Raw Water System	Datchet intake capacity increase	CON-RWS-DAT	Thames (Cookham to Egham)	GB106039023231	River	N	This element involves an increase in abstraction capacity within existing licence limits and the aggregate limit of the Lower Thames licence. Negligible risk to WFD status.
Conveyance: Raw Water System	Littleton Intake Capacity increase transfers to Queen Mary	CON-RWS-LTN-300	Thames (Egham to Teddington)	GB106039023232	River	N	This element involves an increase in abstraction capacity within existing licence limits and the aggregate limit of the Lower Thames licence. Negligible risk to WFD status.
Conveyance: Raw Water Transfer	Raw Water Transfer Deerhurst to Culham 300 Ml/d	CON-RWT-DEH-CLM-300	Severn - conf R Avon to conf Upper Parting Thames (Evenlode to Thame) Thames Wallingford to Caversham Thames (Reading to Cookham) Thames (Cookham to Egham) Thames (Egham to Teddington)	GB109054044404 GB106039030334 GB106039030331 GB106039023233 GB106039023231 GB106039023232	Rivers	Y	-
Conveyance: Raw Water Transfer	Raw Water Transfer Deerhurst to Culham 400 Ml/d	CON-RWT-DEH-CLM-400	Severn - conf R Avon to conf Upper Parting	GB109054044404 GB106039030334	Rivers	Y	-

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
			Thames (Evenlode to Thame) Thames Wallingford to Caversham Thames (Reading to Cookham) Thames (Cookham to Egham) Thames (Egham to Teddington)	GB106039030331 GB106039023233 GB106039023231 GB106039023232			
Conveyance: Raw Water Transfer	Raw Water Transfer Deerhurst to Culham 500 Ml/d	CON-RWT-DEH-CLM-500	Severn - conf R Avon to conf Upper Parting Thames (Evenlode to Thame) Thames Wallingford to Caversham Thames (Reading to Cookham) Thames (Cookham to Egham) Thames (Egham to Teddington)	GB109054044404 GB106039030334 GB106039030331 GB106039023233 GB106039023231 GB106039023232	Rivers	Y	-
Conveyance: Reuse	Reuse Beckton to Lockwood 300 Ml/d	CON-RU-BEC-LCK	N/A	N/A	N/A	N	There is no new abstraction or discharge to a WFD water body associated with this element. Therefore, there is no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction methods.
Conveyance: Raw Water System	TLT extension from Lockwood to KGV - 800Ml/d	CON-RWS-LCK-KGV-800	Lee Navigation Enfield Lock to Tottenham Locks King George V Reservoir	GB106038027950 GB30641523	River Lake	Y	-
Conveyance: Reuse	Reuse Deephams to new TLT extension	CON-RU-DPH-TLT EX	N/A	N/A	N/A	N	There are no abstractions or discharges associated with the conveyance element. Any impacts

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
							associated with the construction of the tunnel or outfall will be mitigatable. Therefore, there is no risk of WFD deterioration.
Conveyance: Reuse	Reuse Deephams to KGV intake	CON-RU-DPH-KGV	Lee Navigation Enfield Lock to Tottenham Locks King George V Reservoir	GB106038027950 GB30641523	River Lake	Y	-
Network: Desalination	Desalination North Beckton to Coppermills 150 Ml/d	NET-DES-BEC-COP	N/A	N/A	N/A	N	There are no abstractions or discharges associated with the transfer element. No likely impact on WFD water bodies during construction subject to good practice construction methods.
Network: Desalination	Desalination South Crossness to Beckton 300 Ml/d	NET-DES-CRO-BEC	N/A	N/A	N/A	N	There are no abstractions or discharges associated with the transfer element. No likely impact on WFD water bodies during construction subject to good practice construction methods.
Network: TWRM	TWRM extension - Hampton to Battersea link	NET-TWRM-HAM-BAT	N/A	N/A	N/A	N	Conveyance option only. No likely impact on WFD water bodies during construction subject to good practice construction.
Network: TWRM	TWRM extension - Coppermills to Honor Oak	NET-TWRM-COP-HON	N/A	N/A	N/A	N	Conveyance option only. No likely impact on WFD water bodies during construction subject to good practice construction.
Network: TWRM	TWRM extension - Coppermills New Header tank	NET-TWRM-COP-HEA	N/A	N/A	N/A	N	No likely impact on WFD water bodies during construction subject to good practice construction.
Network: TWRM	TWRM extension - Riverhead Pump Replacement	NET-TWRM-NRV-PUM	N/A	N/A	N/A	N	No likely impact on WFD water bodies during construction subject to good practice construction.
Network: TWRM	TWRM extension - Barrow Hill Pump Replacement	NET-TWRM-BAR-PUM	N/A	N/A	N/A	N	No likely impact on WFD water bodies during construction subject to good practice construction.
Network: TWRM	New Shaft at Kempton	NET-TWRM-KEM	N/A	N/A	N/A	N	No likely impact on WFD water bodies during construction subject to good practice construction.
Resource: Inter-Company Transfers	SEW to GUI 10 Ml/d (Hogsback-Mount)	RES-ICT-SEW-GUI-MNT-10	N/A	N/A	N/A	N	There is no new abstraction or discharge to a WFD water body. No likely impact on WFD water bodies

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
							during construction subject to good practice construction.
Resource: Aquifer Recharge	South London Artificial Recharge Scheme (SLARS) – Kidbrooke	RES-AR-SLARS1-7	N/A	N/A	N/A	N	The option involves equipping two existing Kidbrooke abstraction/ recharge boreholes approximately 130m apart in the confined Chalk aquifer in south London, with associated headworks, borehole pumps and control buildings. A monitoring programme will be undertaken during test pumping to check potential impacts on groundwater resources but no likely risk of deterioration to WFD groundwater bodies because the recharge water will be injected into a confined Chalk aquifer [non-WFD aquifer]. The scheme will not interact with any surface water features or terrestrial ecosystems. No likely impact on WFD water bodies during construction subject to good practice construction.
Resource: Aquifer Recharge	AR Merton (SLARS3) - 5 Ml/d	RES-AR-SLARS3	Thames (Egham to Teddington)	GB106039023232	River	Y	-
Resource: Aquifer Recharge	AR Streatham (SLARS2) - 4 Ml/d	RES-AR-SLARS2	Thames (Egham to Teddington)	GB106039023232	River	Y	-
Resource: Aquifer Storage & Recovery	ASR South East London (Addington) - 3 Ml/d	RES-ASR-SEL	Epsom North Downs Chalk Kent Greensand Western	GB40601G602200 GB40601G500500	Groundwaters	Y	Note the source water would be abstracted within current abstraction licence conditions and recharged from groundwater source assessed by EA as sustainable.
Resource: Aquifer Storage & Recovery	ASR Thames Valley/Thames Central - 1 Ml/d	RES-ASR-TV	Thames (Egham to Teddington)	GB106039023232	River	Y	-
Resource: Desalination	Desalination North Beckton RO Treatment Plant 150 Ml/d	RES-DES-BEC	Thames Middle	GB530603911402	Transitional water	Y	-
Resource: Desalination	Desalination South Crossness RO Treatment Plant 100 Ml/d	RES-DES-CRO	Thames Middle	GB530603911402	Transitional water	Y	-
Resource: Groundwater	Groundwater Mortimer disused source (recommission) - 4.5 Ml/d	RES-GW-MOR	N/A	N/A	N/A	N	This abstraction is from the confined chalk aquifer [non-WFD aquifer] with no impact on any WFD surface water

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
							or groundwater bodies and no risk of WFD deterioration. The licence is due for AMP7 investigation but there is currently understood to be no risk of WFD deterioration. Any residual deterioration risk identified by the investigation would be mitigated by minimising the duration of peak period abstraction.
Resource: Groundwater	Groundwater London confined Chalk (north) - 2 Ml/d	RES-GW-LCC	N/A	N/A	N/A	N	The proposed abstraction is from the confined chalk aquifer with no interaction with any surface water features or terrestrial ecosystems. Therefore, there is no risk of WFD deterioration.
Resource: Groundwater	Groundwater Southfleet/ Greenhithe (new WTW) - 8 Ml/d	RES-GW-SOU	West Kent Darent and Cray Chalk (Greenhithe) North Kent Medway Chalk (Southfleet) Middle and Lower Darent	GB40601G501800 GB40601G500300 GB106040024222	Groundwaters River	N	The abstraction from the West Kent Darent and Cray Chalk is a peak licence increase and assessed by EA as a sustainable water resource. The North Kent Medway Chalk is poor quantitative and chemical status but anticipated to recover with cessation of Eastern Quarry dewatering. This option is considered sustainable in the context of the dewatering ceasing.
Resource: Groundwater	Groundwater Dapdune Licence Disaggregation - 2.2 Ml/d	RES-GW-DAP	Wey (Shalford to River Thames confluence at Weybridge)	GB106039017630	River	N	Option element involves the disaggregation of peak rates within existing licences with no overall increase in abstraction from the WFD ground water body. The short-term minor increases in the peak rate by its nature will only be for relatively infrequent and limited durations and so has negligible impact compared to the average abstraction rate, and is even less likely to have impact in the context of the impact pathway in this case. Licences are assessed by EA as sustainable, noting the average and total rate retained.
Resource: Groundwater	Groundwater Addington - 1 Ml/d	RES-GW-ADD	Epsom North Downs Chalk	GB40601G602200	Groundwater	N	Abstraction within existing licence limits and no impact of surface water bodies is anticipated. Licence assessed by EA as sustainable.

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Resource: Groundwater	Groundwater - Moulsford 1.0 - 3.5 Ml/d	RES-GW-MOU	Vale of White Horse Chalk Thames Wallingford to Caversham	GB40601G601000 GB106039030331	Groundwater River	Y	Note current abstraction licence assessed by EA as sustainable.
Resource: Recommissioning Groundwater	Recommissioning Groundwater Merton	RES-RC-MTN	N/A	N/A	N/A	N	This option to recommission the currently disused groundwater source, abstracts from the confined chalk aquifer [non- WFD aquifer] and therefore no risk of deterioration in WFD status.
Resource: Inter-Company Transfers	Inter-Company Transfer - Wessex Water to SWOX 2.9 Ml/d (Flaxlands)	RES-ICT-WES-FLX	N/A	N/A	N/A	N	There is no new abstraction or discharge to a WFD water body. No likely impact on WFD water bodies during construction subject to good practice construction.
Resource: Inter-Zonal Transfers	Henley to SWOX 2.37 Ml/d	RES-IZT-HEN-SWX-NET-2.37	South-West Chilterns Chalk Thames (Reading to Cookham)	GB40601G601100 GB106039023233	Groundwaters River	Y	Note the source water would be abstracted within current licence conditions at the Sheeplands source assessed as a sustainable licence by EA.
Resource: Raw water transfer support	Raw Water Transfer Upper Severn Vyrnwy 180 Ml/d (Lon only)	RES-RWTS-VYR	Vrynwy - Lake Vrynwy to conf Afon Cownwy Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy Afon Vyrnwy DS of Banwy confluence Afon Vyrnwy - conf Afon Tanat to conf R Severn	GB109054049880 GB109054049720 GB109054049852 GB109054049800	Rivers	Y	-
Resource: Raw water transfer support	Raw Water Transfer Mythe 15 Ml/d (Lon only)	RES-RWTS-MYT	N/A	N/A	N/A	N	Option element is (part) licence transfer and no new abstraction from a WFD water body as part of this element.
Resource: Removal of Constraints	RC Datchet Main Replacement - 9.3 Ml/d	RES-RC-DAT	N/A	N/A	N/A	N	There is no new abstraction or discharge to a WFD water body. No likely impact on WFD water bodies during construction subject to good practice construction.
Resource: Removal of Constraints	RC Ashton Keynes borehole pumps - 2.5 Ml/d	RES-RC-ASH	Burford Jurassic Churn (Baunton to Cricklade)	GB40601G60040 GB106039029750	Groundwater River	Y	Note the existing licence is due for AMP7 WFD investigation under WINEP

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Resource: Removal of Constraints	RC East Woodhay borehole pumps - 2.1 Ml/d	RES-RC-EWO	N/A	N/A	N/A	N	The proposed abstraction is from the confined chalk aquifer [non-WFD aquifer] and will not interact with any surface water features or terrestrial ecosystems. The existing licence is due for AMP7 investigation but there is currently understood to be no risk of WFD deterioration.
Resource: Removal of Constraints	RC Dapdune - removal of constraints to DO - 3.2 Ml/d	RES-RC-DAP	N/A	N/A	N/A	N	This option abstracts from the confined chalk aquifer [non- WFD aquifer] and therefore no risk of deterioration in WFD status. Licence assessed by EA as sustainable.
Resource: Removal of Constraints	Eton - removal of constraints to DO - 1.3 Ml/d	RES-RC-ETN	N/A	N/A	N/A	N	No new abstraction or discharge to a WFD water body with no likely risk of deterioration in WFD status. Licence assessed by EA as sustainable.
Resource: Removal of Constraints	Ladymead WTW - removal of constraints to DO - 7.8 Ml/d	RES-RC-LAD	N/A	N/A	N/A	N	No new abstraction or discharge to a WFD water body with no likely risk of deterioration in WFD status. Licence assessed by EA as sustainable. No likely impact on WFD water bodies during construction subject to good practice construction.
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 150Mm^3	RES-RRR-ABI-150Mm^3	Cow Common Brook and Portobello Ditch Thames (Evenlode to Thame) Thames Wallingford to Caversham Thames (Reading to Cookham) Thames (Cookham to Egham) Thames (Egham to Teddington)	GB106039023360 GB106039030334 GB106039030331 GB106039023233 GB106039023231 GB106039023232	Rivers	Y	-
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 125Mm^3	RES-RRR-ABI-125Mm^3	Cow Common Brook and Portobello Ditch Thames (Evenlode to	GB106039023360 GB106039030334	Rivers	Y	-

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
			Thame)				
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to Cookham)	GB106039023233			
			Thames (Cookham to Egham)	GB106039023231			
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 100Mm^3	RES-RRR-ABI-100Mm^3	Cow Common Brook and Portobello Ditch	GB106039023360	Rivers	Y	-
			Thames (Evenlode to Thame)	GB106039030334			
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to Cookham)	GB106039023233			
			Thames (Cookham to Egham)	GB106039023231			
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reservoir	New Reservoir South East Strategic Reservoir Option 75Mm^3	RES-RRR-ABI-75Mm^3	Cow Common Brook and Portobello Ditch	GB106039023360	Rivers	Y	-
			Thames (Evenlode to Thame)	GB106039030334			
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to Cookham)	GB106039023233			
			Thames (Cookham to Egham)	GB106039023231			

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reservoir	South East Strategic Reservoir Option 30+100Mm^3 Phase 1	RES-RRR-ABI-30+100Mm^3-P1	Cow Common Brook and Portobello Ditch	GB106039023360	Rivers	Y	-
			Thames (Evenlode to Thame)	GB106039030334			
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to Cookham)	GB106039023233			
			Thames (Cookham to Egham)	GB106039023231			
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reservoir	South East Strategic Reservoir Option 30+100Mm^3 Phase 2	RES-RRR-ABI-30+100Mm^3-P2	Cow Common Brook and Portobello Ditch	GB106039023360	Rivers	Y	-
			Thames (Evenlode to Thame)	GB106039030334			
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to Cookham)	GB106039023233			
			Thames (Cookham to Egham)	GB106039023231			
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reservoir	South East Strategic Reservoir Option 80+42Mm^3 Phase 1	RES-RRR-ABI-80+42Mm^3-P1	Cow Common Brook and Portobello Ditch	GB106039023360	Rivers	Y	-
			Thames (Evenlode to Thame)	GB106039030334			
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to	GB106039023233			

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
			Cookham)				
			Thames (Cookham to Egham)	GB106039023231			
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reservoir	South East Strategic Reservoir Option 80+42Mm^3 Phase 2	RES-RRR-ABI-80+42Mm^3-P2	Cow Common Brook and Portobello Ditch	GB106039023360	Rivers	Y	-
			Thames (Evenlode to Thame)	GB106039030334			
			Thames Wallingford to Caversham	GB106039030331			
			Thames (Reading to Cookham)	GB106039023233			
			Thames (Cookham to Egham)	GB106039023231			
			Thames (Egham to Teddington)	GB106039023232			
Resource: Reuse	Reuse Beckton 100 Ml/d	RES-RU-BEC-100	Thames Middle	GB530603911402	Transitional water	Y	-
Resource: Reuse	IPR Reuse Beckton 100 Ml/d x 3 phases to get 300 Ml/d	RES-RU-BEC-100	Thames Middle	GB530603911402	Transitional water	Y	-
Resource: Reuse	Reuse Beckton 150 Ml/d	RES-RU-BEC-150	Thames Middle	GB530603911402	Transitional water	Y	-
Resource: Reuse	Reuse Deephams 46.5 Ml/d	RES-RU-DPH	Pymmes and Salmon Brooks	GB106038027910	Rivers	Y	-
			Lea Tottenham Locks to Bow Locks/Three Mills Locks	GB106038077852			
Treatment: London	Kempton WTW new 100 Ml/d	WTW-LON-KEM-100	N/A	N/A	N/A	N	No abstraction or discharge to a WFD water body so no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction. Any potential requirement for diversion of watercourses to be agreed with the EA to ensure no deterioration of WFD

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
							status and avoiding adverse effects on river environment.
Treatment: London	Kempton WTW new 150 Ml/d	WTW-LON-KEM-150	N/A	N/A	N/A	N	No abstraction or discharge to a WFD water body so no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction. Any potential requirement for diversion of watercourses to be agreed with the EA to ensure no deterioration of WFD status and avoiding adverse effects on river environment.
Treatment: London	Kempton WTW new 300 Ml/d	WTW-LON-KEM-300	N/A	N/A	N/A	N	No abstraction or discharge to a WFD water body so no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction. Any potential requirement for diversion of watercourses to be agreed with the EA to ensure no deterioration of WFD status and avoiding adverse effects on river environment.
Treatment: London	Coppermills WTW extension 100 Ml/d	WTW-LON-COP-100	N/A	N/A	N/A	N	No abstraction or discharge to a WFD water body so no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction.
Treatment: London	Coppermills WTW extension 150 Ml/d	WTW-LON-COP-150	N/A	N/A	N/A	N	No abstraction or discharge to a WFD water body so no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction.
Treatment: SWOX	South East Strategic Reservoir Option WTW new 24 Ml/d (SWOX)	WTW-SWOX-ABI	N/A	N/A	N/A	N	No new abstraction from a WFD water body as part of this element. Water treatment process water discharges and the emergency overflow arrangements to be consented by the EA which will ensure no adverse effects on the environment or WFD status. No likely impact on WFD water bodies during

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
							construction subject to good practice construction.
Treatment: SWOX	Radcot WTW new 24 Ml/d (SWOX)	WTW-SWOX-RAD	N/A	N/A	N/A	N	No new abstraction from a WFD water body as part of this element. Water treatment emergency overflow arrangements to be consented by the EA which will ensure no adverse effects on the environment or WFD status. No likely impact on WFD water bodies during construction subject to good practice construction.
Conveyance: Raw Water System	Medmenham Intake – 80Ml/d SWA South	CON-RWS-SWA-MMM	Thames (Reading to Cookham)	GB106039023233	River	Y	-
Treatment: SWA	Medmenham WTW – 24Ml/d SWA South	WTW-SWA-MMM	N/A	N/A	N/A	N	No abstraction or discharge to a WFD water body so no risk of deterioration in WFD status. No likely impact on WFD water bodies during construction subject to good practice construction.
Conveyance: Raw Water System	Conveyance from Break Tank to Coppermills via Res 5 – (Spine 2)	CON-RWS-BT-COP-800	Lee (Tottenham Locks to Bow Locks/Three Mills Locks)	GB106038077852	River	N	There are no abstractions or discharges associated with the transfer element. No likely impact on WFD water bodies during construction subject to good practice construction methods.
Conveyance: Raw Water System	RWS_Surbiton intake capacity increase	CON-RWS-SUR-100	Thames (Egham to Teddington)	GB106039023232	River	N	No increase in total abstraction rate from River Thames or change to residual flows over Teddington Weir which remain within existing licence.
Conveyance: Raw Water System	Chingford South intake capacity increase	CON-RWS-CHS-PS-100	Lea Navigation Enfield Lock to Tottenham Locks	GB106038027950	River	N	Minor change in location of abstraction within existing licence rates and volumes. Impacted length of watercourse between the Chingford South and Chingford Supply Channel intakes is short (~1.8km and of negligible ecological value (currently Bad ecological status in this concrete channel). No likely WFD compliance risks.
Conveyance: Raw Water System	KGV to BPT south of William Girling - 300Ml/d	CON-RWS-KGV-BT-300	Lee (Tottenham Locks to Bow Locks/Three Mills Locks)	GB106038077852	River	N	This option provides alternative raw water distribution from King George V Reservoir with no WFD risks.

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Treatment: SWOX	SWA north: South East Strategic Reservoir Option - SWA WTW (24Ml/d)	WTW-SWOX-ABI-SWA	N/A	N/A	N/A	N	This option involves the construction of a new WTW adjacent to a South East Strategic Reservoir Option, with no WFD risks.
Network	SWA north: South East Strategic Reservoir Option treated water transfer to SWA	NET-IZT-AB-LC-72	N/A	N/A	N/A	N	This option involves treated water transfers between a new WTW adjacent to a South East Strategic Reservoir Option and several new service reservoirs. No WFD risks identified.
Resource: Raw water transfer support	Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 148 Ml/d	RES-RWTS-VYR-148	Vrynwy - Lake Vrynwy to conf Afon Cownwy Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy Afon Vyrnwy DS of Banwy confluence Afon Vyrnwy - conf Afon Tanat to conf R Severn	GB109054049880 GB109054049720 GB109054049852 GB109054049800	Rivers	Y	-
Resource: Raw water transfer support	Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 60 Ml/d	RES-RWTS-VYR-60	Vrynwy - Lake Vrynwy to conf Afon Cownwy Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy Afon Vyrnwy DS of Banwy confluence Afon Vyrnwy - conf Afon Tanat to conf R Severn	GB109054049880 GB109054049720 GB109054049852 GB109054049800	Rivers	Y	-
-	Didcot	RES-DRA-DID	Thames (Evenlode to Thame)	GB106039030334	River	N	Option element is licence transfer and no new abstraction from a WFD water body as part of this element.
Resource: Raw water transfer support	Transfer of Minworth Effluent 115 Ml/d	RES-RWTS-MIN	Tame - R Rea to R Blythe Avon (Wark) conf R Leam to Tramway Br, Stratford	GB104028046841 GB109054044402	Rivers	Y	-
Resource: Raw water transfer support	Netheridge Final Effluent Transfer	RES-RWTS-NTH	Severn - conf R Avon to conf Upper Parting	GB109054044404	River	Y	-

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Resource: Raw water transfer support	Vyrnwy Transfer to Severn Trent Water 12Ml/d	RES-RWTS-SHR-12	Severn - conf Bele Bk to conf Sundorne Bk	GB109054049142	River	Y	-
Resource: Raw water transfer support	Vyrnwy Transfer to Severn Trent Water 30Ml/d	RWP_STT UU/ST OPT B	RES-RWTS-VYR-60	GB109054049142	River	Y	-
Resource: Raw water transfer support	River Wye to Deerhurst 60 Ml/d	RES-RWTS-WYE-60.3	Wye - Hampton Bishop to conf Kerne Br	GB109055037112	River	Y	-
Conveyance: Raw Water systems	South East Strategic Reservoir Option to Farmoor 24 Ml/d	CON-RWS-ABI-FMR	Farmoor Reservoir	GB30641011	Lake	Y	-
Conveyance: Raw Water Systems	Medmenham Raw water intake and transfer	CON-RWS-MMM-53	Thames (Reading to Cookham)	GB106039023233	River	Y	-
Conveyance: Raw Water System	Oxford Canal - Farmoor 15	CON-RWS-OXC-FMR-15	N/A	N/A	N/A	N	This is a pipeline only element and is without WFD risks. No likely impact on WFD water bodies during construction subject to good practice construction.
Network	Shalford to Netley Mill	NET-GUI-SFD-NML	N/A	N/A	N/A	N	Option element involves a treated water transfer and does not involve any increase in abstraction at Shalford (River Wey), therefore no WFD risks.
Resource: Aquifer Storage & Recovery	Horton Kirby	RES-ASR-HTK	West Kent Darent and Cray Chalk	GB40601G501800	Groundwater	Y	Note the source water would be abstracted from a number of sources within the water supply zone, within current licence conditions from groundwater sources assessed by EA as sustainable.
Resource: Groundwater	Groundwater Datchet 5.7 Ml/d	RES-GW-DAT	Thames (Cookham to Egham)	GB106039023231	River	Y	Note current licence assessed by EA as sustainable.
Resource: Groundwater	Groundwater Honor Oak – 2.8 Ml/d	RES-GW-HON	Ravensbourne (Catford to Deptford)	GB106039023270	River	Y	-
Network	SWA north: South East Strategic Reservoir Option treated water transfer to SWA	NET-IZT-AB-LC-48	N/A	N/A	N/A	N	This option involves treated water transfers between a new WTW adjacent to a South East Strategic Reservoir Option and several new service reservoirs. No WFD risks identified.

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Network	SWA North: South East Strategic Reservoir treated water transfer to SWA	NET-IZT-AB-BS-48	N/A	N/A	N/A	N	Option element involves treated water transfers between a new WTW adjacent to a South East Strategic Reservoir Option and several new service reservoirs. No WFD risks identified.
Resource: Inter-Zonal Transfers	Henley to SWA 2.37 Ml/d	RES-IZT-HEN-SWA-HAM-2.37	Maidenhead chalk	GB40601G602600	Groundwater	Y	Note the source water would be abstracted within current licence conditions at the Sheeplands source assessed as a sustainable licence by EA.
Resource: Inter-Zonal Transfers	Henley to SWA 5 Ml/d	RES-IZT-HEN-SWA-HAM-5	Maidenhead chalk	GB40601G602600	Groundwater	Y	Note the source water would be abstracted within current licence conditions at the Sheeplands source assessed as a sustainable licence by EA.
Resource: Inter-Zonal Transfers	Henley to SWOX 5 Ml/d	RES-IZT-HEN-SWX-NET-5	South-West Chilterns Chalk Thames (Reading to Cookham)	GB40601G601100 GB106039023233	Groundwaters River	Y	Note the source water would be abstracted within current licence conditions at the Sheeplands source assessed as a sustainable licence by EA.
Resource: Inter-Zonal Transfers	Kennet Valley to SWOX 2.28 Ml/d	RES-IZT-KEN-SWX-2.3	Kennet and Holy Brook	GB106039023140	River	N	Abstraction within existing licence conditions and small volume of abstraction relative to the flow in the River Kennet at the Fobney source. Fobney source assessed as a sustainable licence by EA. No likely WFD risks identified.
Resource: Inter-Zonal Transfers	Kennet Valley to SWOX 6.74 Ml/d	RES-IZT-KEN-SWX-6.7	Kennet and Holy Brook	GB106039023140	River	N	Abstraction within existing licence conditions and small volume of abstraction relative to the flow in the River Kennet at the Fobney source. Fobney source assessed as a sustainable licence by EA. No likely WFD risks identified.
Resource: Removal of Constraints	Britwell - Removal of Constraints	RES-RC-BTW	Vale of White Horse Chalk Chalgrove Brook	GB40601G601000 GB106039023740	Groundwater River	Y	Note the existing licence is due for AMP7 sustainability investigation
Resource: Raw water transfer support	Oxford Canal Transfer to Cropredy 15Ml/d	RES-RWTS-OXC-CRP-15	Tame Anker Mease – Coal Measures Black Country Tame Anker Mease – PT Sandstone Birmingham Lichfield	GB40402G992400 GB40401G301000	Groundwater	Y	Interactions between canals and rivers locally along the transfer route, such as at canal overspill weirs would not change as a consequence of transfer. Normal operating water levels would be maintained

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
			Tame (W/ton Arm) source to conf Oldbury Perry Well Tame – conf two arms to R Rea Cherwell (Cropredy to Nell Bridge) Cherwell (Nell Bridge to Bletchingdon) Cherwell (Bletchingdon to Ray)	GB104028046930 GB104028046842 GB106039037310 GB106039037431 GB106039037432	Rivers		unchanged within the canal network. No likely WFD risks are therefore identified to river water bodies along the transfer route prior to the River Cherwell at Cropredy.
Resource: Raw water transfer support	Oxford Canal Transfer to Dukes Cut 15Ml/d	RES-RWTS-OXC-DKC-15	Thames (Evenlode to Thame)	GB106039030334	River	Y	-
Resource: Removal of Constraints	Epsom - Removal of Constraints	RES-RC-EPS	Bromley Tertiaries Hogsmill	GB40602G602300 GB106039017440	Groundwater River	Y	Note the existing licence is due for AMP7 WFD investigation under WINEP
Resource: Removal of Constraints	New River Head - Removal of Constraints – 3.45 Ml/d	RES-RC-NRV	N/A	N/A	N/A	N	The proposed abstraction is from the confined chalk aquifer [non-WFD aquifer] and will not interact with any surface water features or terrestrial ecosystems.
Resource: Raw water purchase	Chingford Raw Water Purchase	RES-RWP-CHD	William Girling Reservoir	GB30641659	Lake	N	Option element involves no new or additional abstraction from a WFD water body as part of this element. Maintains the existing bulk export agreement into the long-term.
Conveyance: Raw Water System	Culham to Farmoor	CON-RWS-CUL-FMR-180	Thames (Evenlode to Thame) Thames Wallingford to Caversham Thames (Reading to Cookham) Thames (Cookham to Egham)	GB106039030334 GB106039030331 GB106039023233 GB106039023231 GB106039023232	Rivers	Y	-

Element Type	Element Name	Element Reference	Water body Name	Water body Code	Water body Type	Screened in?	Reason for screening out of Assessment (where applicable):
Conveyance:	New Gauge - River Lee	TBC	Thames (Egham to Teddington) Lea Navigation Enfield Lock to Tottenham Locks	GB106038027950	River	N	Abstracted water would be flow left in the River Lee from reduction in upstream abstraction, to the same overall flow rate. No likely WFD compliance risks.
Conveyance:	River Wye - Pann Mill	TBC	N/A	N/A	N/A	N	This is a pipeline only element and is without WFD risks. No likely impact on WFD water bodies during construction subject to good practice construction.
Conveyance:	River Wandle - Waddon	TBC	N/A	N/A	N/A	N	This is a pipeline only element and is without WFD risks. No likely impact on WFD water bodies during construction subject to good practice construction.
Conveyance:	River Cray - North Orpington	TBC	N/A	N/A	N/A	N	This is a pipeline only element and is without WFD risks. No likely impact on WFD water bodies during construction subject to good practice construction.

APPENDIX B:
OPTION ELEMENT WFD COMPLIANCE ASSESSMENT OUTCOMES FOR OPTION ELEMENTS (STEP 2)

This section presents the outcomes of the WFD compliance assessment for those option elements screened in for further assessment for the WRMP19. A WFD compliance assessment table is provided below for each WFD water body that may be affected by the option element. The list of option elements included in this appendix are, in order:

- KGV Res intake capacity increase
- Raw Water Transfer Deerhurst to Culham (all variants)
- TLT extension from Lockwood to KGV - 800Ml/d
- Reuse Deephams to KGV intake
- AR Merton (SLARS3) - 5 Ml/d
- AR Streatham (SLARS2) - 4 Ml/d
- ASR South East London (Addington) - 3 Ml/d
- ASR Thames Valley/Thames Central - 1 Ml/d
- Desalination North Beckton RO Treatment Plant 150 Ml/d
- Desalination South Crossness RO Treatment Plant 100 Ml/d
- Groundwater - Moulsford 1.0 - 3.5 Ml/d
- Henley to SWOX 2.37 Ml/d
- Raw Water Transfer Upper Severn Vyrnwy 180 Ml/d (all variants)
- RC Ashton Keynes borehole pumps - 2.5 Ml/d
- New Reservoir South East Strategic Reservoir Option (all variants)
- Reuse Beckton 100 Ml/d
- Reuse Beckton 100 Ml/d x 3 phases to get 300 Ml/d
- Reuse Beckton 150 Ml/d
- Reuse Deephams 46.5 Ml/d
- Medmenham Intake – 80Ml/d SWA South
- Transfer of Minworth Effluent 115 Ml/d
- Netheridge Final Effluent Transfer
- Vyrnwy Transfer to Severn Trent Water 12Ml/d
- Vyrnwy Transfer to Severn Trent Water 30Ml/d
- River Wye to Deerhurst 60 Ml/d
- South East Strategic Reservoir Option to Farmoor 24 Ml/d
- Medmenham Raw water intake and transfer
- Horton Kirby ASR
- Groundwater Datchet 5.7 Ml/d
- Groundwater Honor Oak – 2.8 Ml/d
- Henley to SWA 2.37 Ml/d
- Henley to SWA 5 Ml/d
- Britwell - Removal of Constraints
- Oxford Canal Transfer to Cropredy 15Ml/d
- Oxford Canal Transfer to Dukes Cut 15Ml/d
- Epsom - Removal of Constraints
- Culham to Farmoor

Conveyance: RWS_KGV Res intake capacity increase - CON-RWS-KGV-360

Water body

WFD water body name	Lea Navigation Enfield Lock to Tottenham Locks		
WFD water body type	River		
WFD management catchment	London	**WFD water body ID**	GB106038027950
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Bad	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of additional river intake capacity.		
	Operation: Change in the quality and rate of abstraction of water into the reservoir. Flow rate downstream of the abstraction intake is stated as unaffected.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Construction will be managed by good practice construction methods and any risk of suspended material, site runoff pollutants, geomorphological action from working in the watercourse to the water body is assessed as low. Temporary effects due to the construction will not cause deterioration of the water body. The increased abstraction capacity would ensure that the rate of additions of source water (either reuse or River Thames water) would be re-abstracted, maintaining the baseline river flow rate downstream. The downstream quality would be amended, reflecting the blend of source waters with the baseline River Lee water quality. Tertiary treatment has been included for the reuse options as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). On the assumption of baseline downstream flow regime and appropriate river water quality, no deterioration risk is anticipated.
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Bad	Bad	
Chemical (Overall)	Good	Good	Discharge quality will depend on source water – either tertiary reuse water or River Thames water. It is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). Therefore, the risk of deterioration in chemical status is assessed as low.
Protected Area Details	Drinking water: The water body is a drinking water protected area (Lee Navigation Subsidiary A). Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.

	4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including the King George V Reservoir assessed below.
	5. Assists attainment of water body objectives	No; design does not currently integrate with the package of potential river restoration measures currently under review by Thames Water as part of the AMP6 NEP abstraction investigation for the Lower Lee.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	King Georges Reservoir		
WFD water body type	Lake		
WFD management catchment	London	**WFD water body ID**	GB30641523
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-
Hydromorphological designation		Artificial	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None		
	Operation: Change in the quality and rate of water abstracted into the reservoir		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Water available for abstraction will be a blend of River Lee water (as baseline) together with reuse water or River Thames Water, depending on resource. Tertiary treatment has been included for each option as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). There is no 2015 fish or Chironomid (CPET) status assessment available. Phytoplankton was assessed as Poor status in 2015 and total phosphorous as Bad. Given that the treated wastewater will be treated to high standards and that the status of the River Lea navigation is Poor for phosphate, the scheme is considered unlikely to lead to deterioration in these elements. The maintenance of higher reservoir levels and increase in rate of reservoir turnover may assist with improvements in phosphate and phytoplankton status.
Chironomids (CPET)	Not assessed	Not assessed	
Phytoplankton	Poor	Poor (uncertain)	
Chemical (Overall)	Good	Good	Water available for abstraction will be a blend of River Lee water (as baseline) together with reuse water or River Thames Water, depending on resource. Tertiary treatment has been included for each option as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). Therefore, the risk of deterioration in chemical status is assessed as low.
Protected Area Details		Drinking water: The water body is a drinking water protected area (King George V Reservoir). Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including the River Lee Navigation Enfield Lock to Tottenham Locks.
5. Assists attainment of water body objectives	No; design does not currently integrate with the package of potential river restoration measures currently under review by Thames Water as part of the AMP6 NEP abstraction investigation for the Lower Lee.

	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Conveyance: Raw Water Transfer - Raw Water Transfer Deerhurst to Culham – all variants (300/400/500 Ml/d) - CON-RWT-DEH-CLM

water body

WFD water body name	Severn - conf R Avon to conf Upper Parting			
WFD water body type	River			
WFD management catchment	Severn Vale		**WFD water body ID**	GB109054044404
River Basin District	Severn			

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the intake and treatment works. **Operation:** Abstraction of water for treatment and transfer. The abstraction may be supported by Mythe WTW unused part of licence – 15 Ml/d; Lake Vyrnwy – 180 Ml/d or other sources. The abstraction may also be unsupported at times and constrained by abstraction licence conditions and proposed hands-off flow conditions to protect flows downstream.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Construction of the intake will be managed by good practice construction methods and any temporary risks to the water body are assessed as low. Temporary effects due to construction will not cause deterioration of the water body. Eel regulation compliant inlet screens are proposed. The greatest proportional change in the flow regime would be reductions in the moderate to low flow conditions and these would have a negligible effect on the flow regime throughout the water body. Increases to flow upstream of the intake under low flow conditions from augmentation schemes would remain within the normal flow envelope. Reduction in flow downstream of abstraction intake would be protected by the hands off flow constraint. There is unlikely to be a change in the physico-chemical quality elements as there will be a negligible effect on the flow regime and therefore the buffering capacity of the river will remain largely the same. In addition, there are no significant discharges within the remainder of the downstream freshwater section of the River Severn. With the hands-off flow conditions set at appropriate levels to safeguard the aquatic environment, there should be no material adverse effects of the abstraction on the River Severn water quality or ecology. Overall, macroinvertebrate status is likely to remain at poor status. Impacts to macrophytes and phytobenthos status are uncertain due to a lack of 2015 status classification.
Macro-invertebrates	Poor	Poor	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	There is unlikely to be a change in the chemical status as there will be a negligible effect on the flow regime and therefore the buffering capacity of the river will remain largely the same.
Protected Area Details			Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected. Severn Estuary SPA and SAC: The Severn Estuary has a very large tidal range and it is not anticipated that the upstream abstraction would have any adverse impact on the qualifying features of these European sites, which would be well habituated to fluctuating water levels and any losses would be replaced twice daily with the tides. Additionally, flows to the estuary will be protected by the hands-off flow conditions governing the abstraction.
Does the component comply with WFD Objective			

	1. No deterioration between status classes	Yes; no deterioration between classes.
	2. No impediments to GES/GEP	Yes; no impediments to GEP
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; no impacts on downstream water bodies.
	5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Thames (Evenlode to Thame)		
WFD water body type	River		
WFD management catchment	Gloucestershire and the Vale	**WFD water body ID**	GB106039030334
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	not designated artificial or heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	YES	YES	NO	YES

Scheme components potentially affecting water body	**Construction**: Construction of the augmentation outfall
	Operation: Release of pre-treated transfer water abstracted from the River Severn to the River Thames at Culham

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Moderate	Moderate	Construction of the outfall will be managed by good practice construction methods such that any risk to the water body is low. Temporary effects due to construction are unlikely to cause deterioration of the water body. The greatest proportion change in the flow would be increases in the low flow to extreme low flow from the regulation releases, with a change to the low flow envelope in the lower reach of the water body when in operation. WRMP studies have identified that this water body would not be subject to undue flow variability beyond its characteristic flow regime from the elevated baseflow due to the existing regulated nature of the river. All variants of the option (300 to 500 Ml/d) would result in moderate to large increases in baseflow but these have been assessed as unlikely to impact on ecology. The 500Ml/d variant would include a higher rate of unsupported abstraction and transfer relative to the total transfer rate, resulting in a highly variable flow regime at times of low and low-moderate flow during summer and autumn, which is not the existing characteristic of this water body. The augmentation flows will be treated to environmental standards for phosphorus, suspended solids, dissolved oxygen therefore there will be a low risk of impacting the physico-chemical quality elements (currently moderate status). An invasive species treatment and management plan will be part of the option, including rapid gravity filtration of the River Severn water prior to discharge to the River Thames where typically 99% of 5µm sized particles (including larvae of invasive species) will be retained. The risk of spread of known and likely invasive species from the Lower Severn to the middle Thames is therefore low. The habitat types of this water body most at risk from flow changes, specifically the change in low flows, are the weir pools due to the change in their level and flow regime. These weir pools are important nursery grounds for fish and provide for diversity of macroinvertebrates – however, the effect on the WFD status of these in the water body as a whole would likely remain the same. The impact on macrophytes and phytobenthos is uncertain due to lack of 2015 status classification. Overall, it is expected that the ecological status will remain the same; however there is some uncertainty in this assessment and further site specific surveys will be required to confirm the assessment should this option be included in the WRMP.
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Fail	Fail	The Severn - conf R Avon to conf Upper Parting is at good chemical status and therefore potentially better water quality than the receiving water body. There is likely to be some metals such as zinc in the abstracted River Severn water which would mostly be in particulate form and therefore likely to be treated at the intake prior to discharge to the River Thames. There is the potential for some organic pollutants to be in the discharged water as they are more difficult to treat.

	Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected. Drinking water protected area: The Thames (Evenlode to Thame) is a drinking water protected area. The risk to a change in chemical status is low. Little Wittenham SAC: As there will be no flow variability beyond the existing characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is assessed as negligible.
	Does the component comply with WFD Objective	
	1. No deterioration between status classes	Yes; no deterioration between classes.
	2. No impediments to GES/GEP	Yes; no impediments to GES.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; potential to affect other water bodies downstream; Thames Wallingford to Caversham: GB106039030331 assessed below as compliant
	5. Assists attainment of water body objectives	No; does not assist with the attainment water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any objectives for the protected areas.

water body

WFD water body name	Thames Wallingford to Caversham		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD water body ID**	GB106039030331
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-

Hydromorphological designation	heavily modified
Water Body Mitigation Measure	Additional treatment to reduce concentrations of phosphate from Stewkley sewage treatment works

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	YES	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None **Operation:** Change in flow regime due to impacts on upstream water body.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Throughout the water body, the greatest proportional change in the flow would be increases in the low flow to extreme low flow conditions from the river regulation releases upstream, with a change to the low flow envelope throughout the water body during operation. There is more flow accretion (e.g. from the River Thame) in this water body and therefore the effects of the releases would be proportionally lower than in the upstream water body and there will be no undue flow variability beyond its characteristic flow regime from the elevated baseflow due to the existing regulated nature of the river. The effects on the water body relating to water quality, invasive species and risk to weir pool habitats are similar to the upstream water body (see above table).
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Good	Good	
Chemical (Overall)	Good	Good	The releases to the upstream water body would be subject to water quality conditions set by the EA to protect WFD status and therefore the risk to deterioration in WFD status is assessed as low.

Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected. Little Wittenham SAC: As there will be no flow variability beyond its characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is assessed as negligible.

Does the component comply with WFD Objective

1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; potential to affect other water bodies downstream; Thames (Reading to Cookham): GB106039023233 assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Thames (Reading to Cookham)		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD water body ID**	GB106039023233
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-

Hydromorphological designation	heavily modified
Water Body Mitigation Measures	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None **Operation:** Change in flow regime due to impacts on upstream water body.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Throughout the water body, the greatest proportional change in the flow would be increases in the low flow to extreme low flow conditions from the river regulation releases upstream, with a change to the low flow envelope throughout the water body during operation. There is more flow accretion (e.g. from the River Thame) in this water body and therefore the effects of the releases would be proportionally lower than in the upstream water body and there will be no undue flow variability beyond its characteristic flow regime from the elevated baseflow due to the existing regulated nature of the river. The effects on the water body relating to water quality, invasive species and risk to weir pool habitats are similar to the upstream water body (see above table).
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	The releases to the upstream water body would be subject to water quality conditions set by the EA to protect WFD status and therefore the risk to deterioration in WFD status is assessed as low.

Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes; further assessment required
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no impacts on downstream water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Thames (Cookham to Egham)		
WFD water body type	River		
WFD management catchment	Maidenhead and Sunbury	**WFD water body ID**	GB106039023231
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None		
	Operation: Change in flow regime due to impacts on upstream water body.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The re-abstraction of the river augmentation releases would commence in this water body. Changes in flow in the water body from operation of the scheme will partly reflect flow augmentation and partly the re-abstraction: the increase in the extreme low flow regime (after accounting for partial re-abstraction of the augmentation flow) would be less than in the upstream water bodies. No impacts on ecological status are anticipated in this water body.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	High	High	
Chemical (Overall)	Good	Good	The discharge will be treated to environmental standards and subject to EA discharge permit conditions; it is expected that there will have been sufficient mixing and dilution with the receiving water upstream and no adverse effects on chemical quality in this water body.
Protected Area Details	Drinking water protected area: The water body is a drinking water protected area. The risk to a change in chemical status is negligible. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected. South West London water bodies SPA and Ramsar: the SPA comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no adverse impact on the SPA because there are no impact pathways of the river augmentation scheme.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; potential to affect other water bodies downstream; Thames (Egham to Teddington): GB106039023232 assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Thames (Egham to Teddington)		
WFD water body type	River		
WFD management catchment	Maidenhead and Sunbury	**WFD water body ID**	GB106039023232
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None		
	Operation: Re-abstraction of augmentation release water		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Changes in flow in the water body from operation of the scheme will partly reflect flow augmentation and partly the re-abstraction: the increase in the extreme low flow regime (after accounting for partial re-abstraction of the augmentation flow) would be less than in the upstream water bodies. At the end of the water body, at the tidal limit (Teddington Weir), and downstream of Thames Water's abstraction intakes, the very low flow to extreme low flow regime would return to the baseline flow conditions without the flow augmentation, with the same range and frequency of pass-forward flows into the upper Thames Tideway downstream of Teddington Weir. The scheme would have a negligible effect on the flow regime throughout this water body. No change in ecological status is anticipated as the flows would return to baseline conditions in this water body and therefore not impact on fish, macroinvertebrates or macrophytes & phytobenthos.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	The discharge will be treated to environmental standards and subject to EA discharge permit conditions; it is expected that there will have been sufficient mixing and dilution with the receiving water upstream and no adverse effects on chemical quality in this water body.
Protected Area Details		Drinking water protected area: The water body is a drinking water protected area. The risk to a change in chemical status is negligible. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected. South West London water bodies SPA and Ramsar: the SPA comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there are no impact pathways of the river augmentation scheme.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on water bodies downstream as no change in moderate or low flows to the downstream transitional water body (Thames Tideway) and negligible change to high flows.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Conveyance: Raw Water System: TLT extension from Lockwood to KGV - 800Ml/d - CON-RWS-LCK-KGV-800

water body

WFD water body name	Lea Navigation Enfield Lock to Tottenham Locks					
WFD water body type	River					
WFD management catchment	London		**WFD water body ID**	GB106038027950		
River Basin District	Thames					
WFD Designations, Objectives and Mitigation						
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**			
	Bad	-	-			
Hydromorphological designation	heavily modified					
Water Body Mitigation Measures	No published mitigation measures					
WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the discharge outfall.		
	Operation: Discharge to the River Lee Diversion upstream of the existing abstraction intake to the King George V Reservoir. A new permit to discharge will be required. Flow rate downstream of the abstraction intake is stated as unaffected.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Construction will be managed by good practice construction methods and any risk of suspended material, site runoff pollutants, geomorphological action from working in the watercourse to the water body is assessed as low. Temporary effects due to the construction will not cause deterioration of the water body. Discharge quality will depend on source water – either tertiary treated reuse water or River Thames water. It is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). There would be a localised flow increase in the Enfield Island Loop channel for less than 500m between the new outfall and the existing abstraction intake which could lead to some local morphological changes in the channel of this Heavily Modified water body. This change in flow will impact <3% of the total water body length of 19.4km, well below the 15% permitted derogation limit. Taking into account the steps to minimise impacts to the ecology, no features should be significantly impacted. WFD status will neither deteriorate nor improve for macrophytes and phytobenthos. There is no 2015 fish status assessment available, but the scheme is considered unlikely to lead to deterioration to fish status.
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Bad	Bad	
Chemical (Overall)	Good	Good	Discharge quality will depend on source water – either tertiary treated reuse water or River Thames water. It is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). Therefore the risk of deterioration in chemical status is assessed as low.
Protected Area Details	Drinking water: The water body is a drinking water protected area (Lee Navigation Subsidiary A). Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit.		

		Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit.
	Does the component comply with WFD Objective	
	1. No deterioration between status classes	Yes; no deterioration between classes.
	2. No impediments to GES/GEP	Yes; no impediments to GEP.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including the King George V Reservoir assessed below
	5. Assists attainment of water body objectives	No; design does not currently integrate with the package of potential river restoration measures currently under review by Thames Water as part of the AMP6 NEP abstraction investigation for the Lower Lee.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body	**WFD water body name**		King Georges Reservoir				
	WFD water body type		Lake				
	WFD management catchment		London	**WFD water body ID**	GB30641523		
	River Basin District		Thames				
	WFD Designations, Objectives and Mitigation						
	WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**			
		Poor	-	-			
	Hydromorphological designation		Artificial				
	Water Body Mitigation Measures	No published mitigation measures					
	WFD Protected Areas						
	Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
	NO	YES	NO	NO	YES	NO	YES
	Scheme components potentially affecting water body		**Construction:** None				
			Operation: Change in the quality and rate of water abstracted into the reservoir				
	WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**				
	Fish	Not assessed	Not assessed	Water available for abstraction will be a blend of River Lee water (as baseline) together with either tertiary treated reuse water or River Thames water. It is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). There is no 2015 fish or Chironomid (CPET) status assessment available. Phytoplankton was assessed as Poor status in 2015 and total phosphorous as Bad. Given that the treated wastewater will be treated to high standards and that the status of the River Lea navigation is Poor for phosphate, the scheme is considered unlikely to lead to deterioration in these elements. The maintenance of higher reservoir levels and increase in rate of reservoir turnover may assist with improvements in phosphate and phytoplankton status.				
	Chironomids (CPET)	Not assessed	Not assessed				
	Phytoplankton	Poor	Poor (uncertain)				
Not assessed	**Chemical (Overall)**	Good	Good	Water available for abstraction will be a blend of River Lee water (as baseline) together with reuse water or River Thames Water, depending on resource. Tertiary treatment has been included for each option as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). Therefore the risk of deterioration in chemical status is assessed as low.				
	Protected Area Details		Drinking water: The water body is a drinking water protected area (King George V Reservoir). Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit.				
	Does the component comply with WFD Objective						
	1. No deterioration between status classes		Yes; no deterioration between classes.				
	2. No impediments to GES/GEP		Yes; no impediments to GEP.				
	3. No compromises to water body objectives		Yes; no compromises to water body objectives.				
	4. No effects on other water bodies		Yes; there are no potential effects on other water bodies including the linked William Girling Reservoir				
	5. Assists attainment of water body objectives		Uncertain; potential improvements in source water quality and reservoir turnover may assist with improvements in phosphate and phytoplankton.				
	6. Assists attainment of protected area objectives		No; does not assist with the attainment of any mitigation measures required for the protected areas.				

Conveyance: Reuse - Reuse Deephams to KGV Intake - CON-RU-DPH-KGV

water body

WFD water body name	Lea Navigation Enfield Lock to Tottenham Locks		
WFD water body type	River		
WFD management catchment	London	**WFD water body ID**	GB106038027950
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Bad	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

Scheme components potentially affecting water body	**Construction:** Construction of the discharge outfall. A stilling chamber will be built around a diffuser manifold with rip-rap / concrete protection to the river channel to protect against any high dissipation energies particularly when at low river flows/levels.
	Operation: Discharge to the River Lee Diversion upstream of the existing abstraction intake to the King George V Reservoir. A new permit to discharge will be required. Flow rate downstream of the abstraction intake is stated as unaffected, subject to any operating agreement changes that may result from the ongoing AMP6 investigation.

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**
Fish	Not assessed	Not assessed
Macro-invertebrates	Moderate	Moderate
Macrophytes & Phytobenthos	Bad	Bad
Chemical (Overall)	Good	Good

Construction will be managed by good practice construction methods and any risk of suspended material, site runoff pollutants, geomorphological action from working in the watercourse to the water body is assessed as low.
Temporary effects due to construction will not cause deterioration of the water body.

The discharge will be treated to tertiary standards for ammonia, phosphate and BOD and therefore there will be a low risk of impacting the physico-chemical quality elements of this water body (currently at moderate status). The discharge will be treated using Reverse Osmosis (for the removal of anions, metals and some organics) and remineralisation is also required so that the water discharged into the river will not impact the aquatic ecology. There would be a localised flow increase in the Enfield Island Loop channel between the new outfall and the existing abstraction intake which could lead to local morphological changes. There would be a localised flow increase in the Enfield Island Loop channel for 100m between the new outfall and the existing abstraction intake which could lead to some local morphological changes in the channel of this Heavily Modified water body. This change in flow will impact <3% of the total water body length of 19.4km, well below the 15% permitted derogation limit. Overall, the impact on the ecology should not significantly impact the WFD elements because of the RO and remineralisation treatment. Fish status was not assessed in 2015, but it is considered unlikely that the scheme would lead to a deterioration in fish status.

The scale of change in river temperature anticipated by the operation of this scheme is minimal, and without compromise to WFD standards, noting the existing downstream pressures on water temperature exerted by the physical nature of the flood relief channel and the short zone of influence (c.500m distance between the reuse outfall and the existing intake, and the equally short distance between the existing intake and the confluence with the Flood Relief Channel).

Tertiary treatment has been included as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water

		uses (raw water for potable supply). Therefore the risk of deterioration in chemical status is assessed as low.
Protected Area Details		Drinking water: The water body is a drinking water protected area (Lee Navigation Subsidiary A). Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit.
Does the component comply with WFD Objective		
1. No deterioration between status classes		Yes; no deterioration between classes.
2. No impediments to GES/GEP		Yes; no impediments to GEP.
3. No compromises to water body objectives		Yes; no compromises to water body objectives.
4. No effects on other water bodies		Yes; there are no potential effects on other water bodies, including the King George V Reservoir assessed below
5. Assists attainment of water body objectives		No; design does not currently integrate with the package of potential river restoration measures currently under review by Thames Water as part of the AMP6 NEP abstraction investigation for the Lower Lee.
6. Assists attainment of protected area objectives		No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD assessment (scoping)

WFD water body name	King Georges Reservoir		
WFD water body type	Lake		
WFD management catchment	London	**WFD water body ID**	GB30641523
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-
Hydromorphological designation		Artificial	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	YES

Scheme components potentially affecting water body	**Construction:** None
	Operation: Change in the quality and rate of water abstracted into the reservoir

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**
Fish	Not assessed	Not assessed
Chironomids (CPET)	Not assessed	Not assessed
Phytoplankton	Poor	Poor (uncertain)
Chemical (Overall)	Good	Good

Tertiary treatment has been included as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply).

There is no 2015 fish or Chironomid (CPET) status assessment available. Phytoplankton was assessed as Poor status in 2015 and total phosphorous as Bad. Given that the treated wastewater will be treated to high standards and that the status of the River Lea navigation is Poor for phosphate, the scheme is considered unlikely to lead to deterioration in these elements. The maintenance of higher reservoir levels and increase in rate of reservoir turnover may assist with improvements in phosphate and phytoplankton status.

Tertiary treatment has been included as part of the option element design and it is assumed that environmental permitting will ensure the discharge quality would be appropriate for the river's environmental requirements and the downstream water uses (raw water for potable supply). Therefore the risk of deterioration in chemical status is assessed as low.

Protected Area Details	Drinking water: The water body is a drinking water protected area (King George's Reservoir). Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit. Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Additions to the source water for the abstraction would be treated to appropriate standards and subject to environmental permit

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including the River Lee Navigation Enfield Lock to Tottenham Locks.
5. Assists attainment of water body objectives	No; design does not currently integrate with the package of potential river restoration measures currently under review by Thames Water as part of the AMP6 NEP abstraction investigation for the Lower Lee.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Groundwater - AR Merton (SLARS3) - 5 Ml/d - RES-AR-SLARS3

Water body

WFD water body name	Thames (Egham to Teddington)		
WFD water body type	River		
WFD management catchment	Maidenhead to Sunbury	**WFD water body ID**	GB106039023232
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-

Hydromorphological designation	heavily modified
Water Body Mitigation Measures	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A **Operation:** Water for artificial recharge sourced from River Thames in West London during periods of low demand. A new winter abstraction licence for the lower River Thames sources may be required. Recharge will be to the confined Chalk aquifer [non-WFD aquifer].

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Hydrological assessment indicates there is likely to be a negligible risk of impact on flows in the Thames (Egham to Teddington) (GB106039023232) due to additional winter abstraction to provide sufficient water for recharge. This negligible reduction of flow in the Thames in the winter will not cause a deterioration in ecological status.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	Given the negligible reductions in flow in the Thames due to abstraction (during the winter period), the chemical status is not expected to deteriorate.

Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Drinking water: The water body is a drinking water protected area. As a negligible impact on flows is expected, there will be no impact on the protected area. South West London water bodies SPA (and Ramsar): the site comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there will be no net change to water levels in the supply reservoirs that form part of this European site.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Aquifer Recharge - AR Streatham (SLARS2) - 4 Ml/d RES-AR-SLARS2

Water body

WFD water body name	Thames (Egham to Teddington)			
WFD water body type	River			
WFD management catchment	Maidenhead to Sunbury	**WFD water body ID**	GB106039023232	
River Basin District	Thames			

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A **Operation:** Water for recharge will be abstracted from the River Thames in West London during periods of low demand. A new winter abstraction licence for the lower River Thames sources may be required. Recharge will be to the confined Chalk aquifer [non-WFD aquifer].

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Hydrological assessment indicates there is likely to be a negligible risk of impact on flows in the Thames (Egham to Teddington) (GB106039023232) due to additional winter abstraction to provide sufficient water for recharge. This negligible reduction of flow in the Thames in the winter will not cause a deterioration in ecological status.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	Given the negligible reductions in flow in the Thames due to abstraction (during the winter period), the chemical status is not expected to deteriorate.

Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Drinking water: The water body is a drinking water protected area. As a negligible impact on flows is expected there will be no impact on the protected area. South West London water bodies SPA (and Ramsar): the site comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there will be no net change to water levels in the supply reservoirs that form part of this European site.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Aquifer Storage & Recovery - ASR South East London (Addington) - 3 Ml/d - RES-ASR-SEL

Water body

WFD water body name	Epsom North Downs Chalk	**WFD water body ID**	GB40601G602200
WFD water body type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	-	-
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	NO	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A		
	Operation: Abstraction from the chalk borehole will be used to support aquifer recharge in the Lower Greensand confined aquifer [non-WFD aquifer] borehole.		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Poor	-	
Dependent Surface water body Status	Poor	Poor	Due to the distance from the unconfined zone, the scheme is unlikely to affect surface water features.
GWDTEs test	Good	Good	There are no known Natura 2000 or SSSI groundwater dependent habitats associated with the ground water body.
Saline Intrusion	Good	Good	Given distances from the sea, saline intrusion is unlikely.
Water Balance	Poor	Poor	The ASR scheme recharges and re-abstracts water from the Lower Greensand, which is separated from the Chalk in this area by around 80m of Gault Clay. Therefore, there is not expected to be any impact on groundwater levels in the Epsom North Downs Chalk. Testing completed at Horton Kirby demonstrates that there is no impact on the unconfined or confined lower Greensand aquifers.
Chemical (Overall)	Good	Good	Status not expected to change.
Protected Area Details	Drinking water: The water body is a drinking water protected area. No impact is expected.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to Good Status	Yes; no impediments to Good Status
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on other water bodies. Kent Greensand Western GB40601G500500 has been assessed below for completeness
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Waterbody

WFD waterbody name	Kent Greensand Western	**WFD waterbody ID**	GB40601G500500
WFD waterbody type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	-	Good
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A **Operation:** Abstraction from the chalk borehole will be used to support aquifer recharge in the Lower Greensand confined aquifer [non-WFD aquifer] borehole.		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Poor	-	
Dependent Surface Water Body Status	Poor	Poor	Following ASR testing at Horton Kirby, it has been demonstrated that there is no impact on the unconfined or confined lower Greensand aquifers.
GWDTEs test	Good	Good	There are no known Natura 2000 or SSSI groundwater dependent habitats associated with the ground water body.
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Poor	Poor	There is no effect on water balance.
Chemical (Overall)	Good	Good	No risk of deterioration in chemical status at a ground water body scale.
Protected Area Details	Drinking water: The water body is a drinking water protected area. No impact is expected. Nutrient sensitive areas: The ground water body is associated with a groundwater nitrate vulnerable zone; however, the scheme is not expected to affect the management of the protected area.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes.		
2. No impediments to GES/GEP	Yes; no impediments to Good Status		
3. No compromises to water body objectives	Yes; no compromises to water body objectives.		
4. No effects on other water bodies	Yes; there are not expected to be effects on dependent WFD water bodies		
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.		

Resource: Aquifer Storage & Recovery - Thames Valley/Thames Central - 1 Ml/d - RES-ASR-TV

water body

WFD water body name	Thames (Egham to Teddington)					
WFD water body type	River					
WFD management catchment	Maidenhead to Sunbury			**WFD water body ID**	GB106039023232	
River Basin District	Thames					

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-

Hydromorphological designation	heavily modified
Water Body Mitigation Measures	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** n/a **Operation:** An increase in licence for abstraction from the River Thames is required to facilitate aquifer recharge during the winter period. Abstraction from the borehole during the summer period will be from the Lower Greensands aquifer, a non-WFD aquifer.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Hydrological assessment indicates there is a negligible risk of impact on flows in the Thames (Egham to Teddington) (GB106039023232) due to abstraction (during the winter period). This is due to the 'negligible' impact on flows (<1% change in the Q95). Due to the negligible change in flows, there is no risk of deterioration in ecological status.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	Given the negligible reductions in flow in the Thames due to abstraction (during the winter period), the chemical status is not expected to deteriorate.

Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Drinking water: The water body is a drinking water protected area. As a negligible impact on flows is expected, there will be no impact on the protected area. South West London water bodies SPA (and Ramsar): the site comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there will be no net change to water levels in the supply reservoirs that form part of this European site.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Desalination - North Beckton RO Treatment Plant - 150 Ml/d - RES-DES-BEC

water body

WFD water body name	Thames Middle		
WFD water body type	Transitional Water		
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911402
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	49.Modify vessel design 50.Vessel Management 26.Sediment management 27. Dredge disposal site selection 28. Manage disturbance 21.Avoid the need to dredge 22.Dredging disposal strategy 23.Reduce impact of dredging 24.Reduce sediment resuspension 25.Retime dredging or disposal		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** The new desalination plant will be located on land within the existing Beckton STW site. Construction of an abstraction intake. **Operation:** Abstraction of brackish water on lower ebb tide and continuous discharge of diluted brine from the desalination plant (after mixing with final effluent from Beckton sewage treatment works). Abstraction will be appropriately screened to avoid fish entrainment, in particular for eel.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	Construction of the intake will be managed by good practice construction methods and any risk to the water body is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. Eel regulation compliant inlet screens will be installed at the abstraction intake. The estimated 26.5Ml/d of Reverse Osmosis process waste water (brine) would be mixed with the Beckton STW final effluent prior to discharge. The resulting salinity of the discharge (which would also include the existing Thames Gateway desalination treatment plant brine) would be less than that prevailing in the Thames Tideway locally at times of operation. No adverse water quality impacts are therefore expected. Abstraction (at up to 31Ml/hr) is unlikely to lead to any significant alterations to tidal hydrodynamics. No changes to ecological status are therefore expected. There would be an overall reduction in 'freshwater' in the middle Thames Tideway of 150Ml/d, with minor effects on the local tidal-dominated salinity cycle and seasonal saline ingress pattern. There are no WFD higher sensitivity habitats in the water body but there is intertidal soft sediment which is classified as low sensitivity and is therefore unlikely to be impacted. There is no history of harmful algae in the water body and therefore will be no risk of changes in temperature or salinity causing harmful algal blooms.
Invertebrates	Good	Good	
Macroalgae	Good	Good	
Phytoplankton	High	High	
Angiosperms	Moderate	Moderate	
Chemical (Overall)	Good	Good	There is no risk of deterioration in chemical status.
Protected Area Details			Nutrient sensitive areas: The transitional water body is associated with a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Thames Estuary & Marshes SPA (and Ramsar): The closest part of the site is approximately 24km from Beckton. Given the distance and the fact that no significant alterations to hydrodynamics, salinity regime or water quality are expected, there will be no impact on this European site.

	Does the component comply with WFD Objective	
	1. No deterioration between status classes	Yes; no deterioration between classes.
	2. No impediments to GES/GEP	Yes; no impediments to GEP.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; no impact on other water bodies.
	5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Desalination - South Crossness RO Treatment Plant – 100 Ml/d - RES-DES-CRO

water body

WFD water body name	Thames Middle		
WFD water body type	Transitional Water		
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911402
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	49.Modify vessel design 50.Vessel Management 26.Sediment management 27. Dredge disposal site selection 28. Manage disturbance 21.Avoid the need to dredge 22.Dredging disposal strategy 23.Reduce impact of dredging 24.Reduce sediment resuspension 25.Retime dredging or disposal		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** The new desalination plant will be located on land. Construction of an abstraction intake. **Operation:** Abstraction of brackish water on lower ebb tide and continuous discharge of diluted brine (by mixing with sewage treatment works final effluent) for a 300Ml/d plant (maximum capacity - 3 phases of development, each of 100 Ml/d capacity).		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	Construction of the intake will be managed by good practice construction methods and any risk to the water body is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. Eel regulation compliant inlet screens will be included. The 53Ml/d reverse osmosis process waste water (brine) would be mixed with the Crossness STW final effluent prior to discharge. The resulting salinity of the discharge would be less than that prevailing in the Thames Tideway at times of operation. No water quality impacts expected and therefore no changes to ecological status are expected. Abstraction (up to 62Ml/hr) is unlikely to lead to any significant alterations to tidal hydrodynamics. No changes to ecological status are therefore expected. There would be an overall reduction in 'freshwater' of the middle Thames Tideway of up to 300Ml/d, with minor effects on the local tidal-dominated salinity cycle and seasonal saline ingress pattern. There are no WFD higher sensitivity habitats in the water body but there is intertidal soft sediment which is classified as low sensitivity and is therefore unlikely to be impacted. There is no history of harmful algae in the water body and therefore will be no risk of changes in temperature or salinity causing harmful algal blooms.
Invertebrates	Good	Good	
Macroalgae	Good	Good	
Phytoplankton	High	High	
Angiosperms	Moderate	Moderate	
Chemical (Overall)	Good	Good	There is no risk of deterioration in chemical status.
Protected Area Details			Nutrient sensitive areas: The transitional water body is associated with a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, no significant changes in water quality are expected. Thames Estuary & Marshes SPA (and Ramsar): The closest part of the site is approximately 20km from Crossness. Given the distance and the fact that no significant alterations to hydrodynamics or water quality are expected, there will be no impact on this European site.
Does the component comply with WFD Objective			

	1. No deterioration between status classes	Yes; no deterioration between classes.
	2. No impediments to GES/GEP	Yes; no impediments to GEP.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; no impact on other water bodies.
	5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Groundwater - Groundwater - Moulsford 1-3.5 Ml/d – RES-GW-MOU

water body

WFD water body name	Vale of White Horse Chalk	**WFD water body ID**	GB40601G601000
WFD water body type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

	RBMP2 Overall Status	Objective (2021)	Objective (2027)
WFD Status and Objectives	Poor	-	-
Water Body Mitigation Measures	No published mitigation measure		

WFD Protected Areas

Bathing Water Directive	Drinking Water Directive	Conservation of Wild Birds Directive	Habitats Directive	Nitrates Directive	Shellfish Directive	Urban Waste Water Treatment Directive
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A		
	Operation: A new abstraction borehole on the west bank of the River Thames.		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Good	-	
Dependent Surface water body Status	Good	Good	There is a risk of impacting on the flows in one flow dependent river water body: Thames Wallingford to Caversham (GB106039030331). As abstracted water would be used up-catchment and most of the flow would be returned upstream through sewage treatment works, therefore, flow reduction would be low.
GWDTEs test	Good	Good	There are no known Natura 2000 or SSSI groundwater dependent habitats associated with the ground water body.
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Good	Good	Thames side source, likely impact on groundwater levels around River Thames unlikely to be significant. As a result the abstraction is unlikely to affect the water balance on a ground water body scale
Chemical (Overall)	Poor	Poor	No risk of deterioration in chemical status at a ground water body scale.
Protected Area Details	Drinking water protected area: the ground water body is a Drinking Water Protected Area but there is no risk of adversely affecting the chemical status at ground water body scale. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes.		
2. No impediments to Good Status	Yes; no impediments to Good Status.		
3. No compromises to water body objectives	Yes; no compromises to water body objectives.		
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including the Thames Wallingford to Caversham		
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.		

water body

WFD water body name	Thames Wallingford to Caversham		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD water body ID**	GB106039030331
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	Additional treatment to reduce concentrations of phosphate from Stewkley sewage treatment works		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	YES	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A		
	Operation: A new abstraction borehole on the west bank of the River Thames.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The EA has highlighted that the flows are potentially non-compliant under fully licensed conditions and therefore a risk to achieving Good Ecological potential and the environment could be damaged. This is in part dependent on changes in river flow resulting from the Childrey Warren sustainability reduction, to be delivered in AMP6, and the planned sustainability investigation of other abstraction licences effects on this river water body in AMP7. Where ecological risks to WFD compliance are identified a hands-off flow condition may be included within licence, where appropriate
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Good	Good	
Chemical (Overall)	Good	Good	Given the negligible reductions in flow in the Thames, the chemical status is not expected to deteriorate.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Little Wittenham SAC: As there will be no flow variability beyond its characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is negligible.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP noting this may require additional licence conditions.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Inter-Zonal Transfer: Henley to SWOX -2.37 Ml/d - RES-IZT-HEN-SWX-NET-2.37

Water body

WFD water body name	South-West Chilterns Chalk	**WFD water body ID**	GB40601G601100
WFD water body type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

	RBMP2 Overall Status	Objective (2021)	Objective (2027)
WFD Status and Objectives	Poor	-	-
Water Body Mitigation Measures	No updated published mitigation measures		

WFD Protected Areas

Bathing Water Directive	Drinking Water Directive	Conservation of Wild Birds Directive	Habitats Directive	Nitrates Directive	Shellfish Directive	Urban Waste Water Treatment Directive
NO	YES	NO	NO	NO	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None		
	Operation: 2.37 Ml/d treated water transfer supported by Sheeplands source		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Poor	-	
Dependent Surface water body Status	Poor	Poor	The transfer will have negligible impacts on the dependent surface water body Thames (Reading to Cookham) (GB106039023233) waterbody, assessed separately below.
GWDTEs test	Good	Good	Temple Island Meadows SSSI consists of wet meadows subject to seasonal flooding and waterlogging. The SSSI is the richest meadow remaining along the Thames, supporting several species which are of local or national importance including the nationally rare summer snowflake *Leucojum aestivum.* The SSSI will not be impacted by the implementation of the transfer, as River Thames levels will be manipulated accordingly to maintain the same flow levels at this location, therefore avoiding any adverse impacts to the SSSI.
Saline Intrusion	Good	Good	Given distances from the sea, saline intrusion is unlikely
Water Balance	Poor	Poor	The abstraction may lead to further deterioration to the waterbody's water balance status
Chemical (Overall)	Good	Good	The abstraction will not affect the ground waterbody's chemical status.
Protected Area Details	Drinking water: The groundwater body is a drinking water protected area but there is unlikely to be a change in water quality as a result of the scheme. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes		
2. No impediments to Good Status	Yes; no impediments to Good Status.		
3. No compromises to water body objectives	Yes; no compromises to water body objectives.		
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including Thames (Reading to Cookham), assessed separately below		
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.		

Water body

WFD water body name	Thames (Reading to Cookham)		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD water body ID**	GB106039023233
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-

Hydromorphological designation	heavily modified
Water Body Mitigation Measures	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A		
	Operation: 2.37 Ml/d treated water transfer supported by Sheeplands source		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The River Thames habitat types most at risk from flow changes, specifically the change in low flows, are the weir pools due to the change in their level and flow regime. These areas are important nursery grounds for fish and provide diversity for of macroinvertebrates – however, the effect on the status of these in the water body as a whole would likely remain the same. The River Thames flow levels are unlikely to be impacted as they can be manipulated to mitigate any loss of depth that may arise. This ensures no adverse impacts on river ecology and Temple Meads SSSI features.
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	No risk of deterioration between chemical status classes
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no impacts on downstream water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Raw Water Transfer - Upper Severn: Vyrnwy (all options) - RES-RWTS-VYR

water body

WFD water body name	Vrynwy - Lake Vyrnwy to conf Afon Cownwy		
WFD water body type	River		
WFD management catchment	Severn Uplands	**WFD water body ID**	GB109054049880
River Basin District	Severn		

WFD Ecological Potential (water body)			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	Good	-

Hydromorphological designation	Unknown
Water body mitigation measures	No published mitigation measures.

WFD Protected Areas						
Bathing Water Directive	**Conservation of Wild Birds Directive**	**Drinking Water Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
No	No	No	No	No	No	No

Scheme components potentially affecting water body	**Construction:** n/a
	Operation: Change to existing river regulation release regime from Vyrnwy reservoir to Afon Vyrnwy.

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	High	High (uncertain)	The hydrological impact is not expected to be significant but the scheme could result in higher low flows during operation. There is potential for changes in water temperature, dissolved oxygen and hydromorphology in the upper reaches of the water body downstream of Vyrnwy Reservoir which could impact on fish populations. Further studies will be undertaken to assess the potential for deterioration in fish status but the current provisional assessment is that the High status will be protected with appropriate mitigation measures. The current (2015) status for macroinvertebrates and macrophytes has not been assessed and therefore it is not possible to assess fully, but environmental assessment studies indicate there would is unlikely to be any adverse effect on these WFD elements.
Macro-invertebrates	Not assessed	Not assessed	
Macrophytes and phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	The release of water from the reservoir is not likely to have an impact on the chemical status.
Protected Area Details		None	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Provisional assessment is YES but further assessment required in dialogue with NRW as to potential need for additional mitigation measures to secure compliance, or otherwise a modification to the scheme to discharge direct to the River Severn.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	
4. No effects on other water bodies	Yes; there is the potential to effect downstream water bodies (GB109054049720, GB109054049852, GB109054049800) assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy		
WFD water body type	River		
WFD management catchment	Severn Uplands	**WFD water body ID**	GB109054049720
River Basin District	Severn		

WFD Ecological Potential (water body)			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	Good	-

Hydromorphological designation	Unknown
Water body mitigation measures	No published mitigation measures.

WFD Protected Areas						
Bathing Water Directive	**Conservation of Wild Birds Directive**	**Drinking Water Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
No	No	No	No	No	No	No

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** n/a **Operation:** Change in flow regime due to changes to upstream water body.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	The hydrological impact is not expected to be significant but there would be an increase to low flow conditions during operation. Changes are unlikely to impact on current Good status of fish in this water body. Macrophytes and macroinvertebrates can be sensitive to increase in flow but their distribution across the wider catchment is not expected to change to a significant degree and therefore the WFD status is likely to remain the same.
Macro-invertebrates	High	High	
Macrophytes and phytobenthos	Good	Good	
Chemical (Overall)	Good	Good	The changes to the low flow regime is not likely to have an impact on the chemical status.

Protected Area Details	N/A

Does the component comply with WFD Objective	
1. No deterioration between status classes	Provisional assessment is YES but further assessment required in dialogue with NRW as to potential need for additional mitigation measures to secure compliance, or otherwise a modification to the scheme to discharge direct to the River Severn.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	
4. No effects on other water bodies	Yes; there is the potential to effect downstream water bodies (GB109054049852, GB109054049800) assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Afon Vyrnwy DS of Banwy confluence		
WFD water body type	River		
WFD management catchment	Severn Uplands	**WFD water body ID**	GB109054049852
River Basin District	Severn		

WFD Ecological Potential (water body)			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	Good	-

Hydromorphological designation	Unknown
water body mitigation measures	No published mitigation measures.

WFD Protected Areas						
Bathing Water Directive	**Conservation of Wild Birds Directive**	**Drinking Water Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
No	No	No	No	No	No	No

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction: n/a**		
	Operation: Change in flow regime due to changes to upstream water bodies.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Cannot definitively assess post-scheme status without the current (2015) status. Environmental assessment studies have indicated no likely adverse effects on river ecology in this water body and therefore no likely change to WFD status.
Macro-invertebrates	Not assessed	Not assessed	
Macrophytes and phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Fail	Fail	The changes to the flow regime in this water body are unlikely to have an impact on the chemical status.
Protected Area Details	None		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Provisional assessment is YES but further assessment required in dialogue with NRW as to potential need for additional mitigation measures to secure compliance, or otherwise a modification to the scheme to discharge direct to the River Severn.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	
4. No effects on other water bodies	Yes; there is the potential to effect downstream water bodies (GB109054049800) assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Afon Vyrnwy - conf Afon Tanat to conf R Severn		
WFD water body type	River		
WFD management catchment	Severn Uplands	**WFD water body ID**	GB109054049800
River Basin District	Severn		

WFD Ecological Potential (water body)			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	Good	-

Hydromorphological designation	Unknown
Water body mitigation measures	No published mitigation measures.

WFD Protected Areas						
Bathing Water Directive	**Conservation of Wild Birds Directive**	**Drinking Water Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
No	No	No	No	No	No	No

Scheme components potentially affecting water body	**Construction: n/a** **Operation:** Change in flow regime due to changes to upstream water bodies.

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The hydrological impact is not expected to be significant in this water body but the scheme could result in higher low flow conditions, but the effects will be ameliorated in this water body by upstream tributary inputs and increased river catchment area. Cannot definitively assess post-scheme status of fish without the current (2015) status but environmental assessment studies indicate a deterioration to fish status is unlikely in this water body. Macrophytes and macroinvertebrates can be sensitive to increase in flow but their distribution across the wider catchment is not expected to change to a significant degree and therefore the WFD status is likely to remain the same.
Macro-invertebrates	Good	Good	
Macrophytes and phytobenthos	Moderate	Moderate	
Chemical (Overall)	Fail	Fail	Scheme unlikely to have an impact on chemical status.
Protected Area Details		None	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GES/GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; complies with WFD objective – no likely material effects on River Severn downstream of Afon Vyrnwy confluence.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Removal of Constraints - RC Ashton Keynes borehole pumps - 2.5 Ml/d - RES-RC-ASH

Waterbody

WFD waterbody name	Burford Jurassic	**WFD waterbody ID**	GB40601G600400
WFD waterbody type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	-	Good
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A		
	Operation: Increase peak abstraction by 2.5 Ml/d		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Good	-	
Dependent Surface Water Body Status	Good	Uncertain	There is a risk of impacting flows in the Churn (Baunton to Cricklade) (GB106039029750) as a result of this groundwater abstraction. A separate assessment is provided below.
GWDTEs test	Good	Good	There are no impacts on any GWDTEs associated with the groundwater body
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Good	Good	The abstraction will not affect the water balance on a groundwater body scale
Chemical (Overall)	Poor	Poor	No risk of deterioration in chemical status at a groundwater body scale.
Protected Area Details	Drinking Water Protected Area: the water body (Burford Jurassic) is a Drinking Water Protected Area but there is a negligible risk of adversely affecting the chemical status at the groundwater body scale Nutrient sensitive areas: The ground water body is associated with a groundwater nitrate vulnerable zone; however, the scheme will not affect the management of the protected area.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes		
2. No impediments to GES/GEP	Yes; no impediments to Good Status.		
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.		
4. No effects on other water bodies	Uncertain, potential risk of deterioration in status classes for dependent surface waterbody Churn (Baunton to Cricklade), assessed separately below.		
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.		

Waterbody

WFD water body name	Churn (Baunton to Cricklade)		
WFD water body type	River		
WFD management catchment	Gloucestershire and the Vale	**WFD waterbody ID**	GB106039029750
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Bad	-	Good

Hydromorphological designation	not designated artificial or heavily modified
Water Body Mitigation Measure	Improvements to longitudinal connectivity to improve fish migration and habitat

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	YES	YES	NO	NO

Scheme components potentially affecting waterbody	**Construction:** N/A
	Operation: Increase peak abstraction by 2.5 Ml/d

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Bad	Uncertain	Although the boreholes at Ashton Keynes abstract from the Great Oolite Group, they are in proximity of the outcrop and have the potential to cause drawdown in the Burford Jurassic. There is a risk of impacting the flow regime and water quality in the River Churn, which is partially fed by the Burford Jurassic aquifer. The river's hydrological regime is currently not supporting good ecological status, this being potentially linked to groundwater abstractions. The flow issues are impacting on ecological elements, most notably fish (currently at bad status) and macrophytes and phytobenthos (currently at moderate status). The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	Moderate	Uncertain	
Chemical (Overall)	Good	Good	There is a negligible risk of deterioration between chemical status classes.
Protected Area Details			Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.

Does the component comply with WFD Objective

1. No deterioration between status classes	Uncertain, potential risk of deterioration in status classes for fish and macrophytes & phytobenthos; further assessment required as part of WINEP investigations to confirm WFD compliance, including application of mitigation measures if required to secure compliance.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.
4. No effects on other water bodies	Yes; no effects on other waterbodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.

Resource: Reservoir - New Reservoir South East Strategic Reservoir Option – all variants:

- Resource: Reservoir - South East Strategic Reservoir Option 75Mm^3 - RES-RRR-ABI-75Mm^3
- Resource: Reservoir - South East Strategic Reservoir Option 150Mm^3 - RES-RRR-ABI-150Mm^3
- Resource: Reservoir - South East Strategic Reservoir Option 125Mm^3 - RES-RRR-ABI-125Mm^3
- Resource: Reservoir - South East Strategic Reservoir Option 100Mm^3 - RES-RRR-ABI-100Mm^3
- Resource: Reservoir - South East Strategic Reservoir Option Phased 30Mm^3/100Mm^3 - RES-RRR-ABI-30+100Mm^3-P1
- Resource: Reservoir - South East Strategic Reservoir Option Phased 80Mm^3/42Mm^3 - RES-RRR-ABI-80+42Mm^3-P1
- Resource: Reservoir - South East Strategic Reservoir Option Phased 30+100Mm^3 Phase 2 - RES-RRR-ABI-30+100Mm^3-P2

Water body

WFD water body name	Cow Common Brook and Portobello Ditch			
WFD water body type	River			
WFD management catchment	Gloucestershire and the Vale	**WFD water body ID**	GB106039023360	
River Basin District	Thames			

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	Good
Hydromorphological designation	not designated artificial or heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Provision of a new fully bunded reservoir requiring diversion of this water course with river restoration measures to deliver environmental enhancement.		
	Operation: None		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The watercourse will be diverted around the perimeter of the reservoir and be designed to intercept the flow. The diversion is to be designed using a 'naturalised' form to enhance environmental and water quality, with the design to be consented by EA to ensure positive effect on WFD objectives and ensure no adverse effects on river environment in this water body or downstream.
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	The diversion is intended to be designed using a 'naturalised' form to enhance water quality.
Protected Area Details	Nutrient sensitive areas (Nitrate vulnerable zones): The water body is associated with a nutrient sensitive area; however, the scheme will not affect the management of the protected area and no adverse effects on water quality are expected.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes, with diversion and river restoration design agreed and consented by the EA.
2. No impediments to GES/GEP	Yes, diversion and river restoration design agreed and consented by the EA.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no impact on downstream water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body	**WFD water body name**	Thames (Evenlode to Thame)					
	WFD water body type	River					
	WFD management catchment	Gloucestershire and the Vale		**WFD water body ID**	GB106039030334		
	River Basin District	Thames					
	WFD Designations, Objectives and Mitigation						
	WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**		**Objective (2027)**		
		Moderate	-		-		
	Hydromorphological designation	not designated artificial or heavily modified					
	Water body Mitigation Measure	No published mitigation measures.					
	WFD Protected Areas						
	Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
	NO	YES	NO	YES	YES	NO	YES
WFD assessment (scoping)	**Scheme components potentially affecting water body**	**Construction:** Construction of the abstraction intake and river regulation discharge outfall structures.					
		Operation: Reservoir refill via abstraction of water from the River Thames. River regulation to augment flows in River Thames by releasing water stored within the reservoir. Abstraction and discharge will be subject to licences/permits granted by the Environment Agency. Abstraction subject to EA hands-off flow conditions for River Thames.					
	WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**				
	Fish	Moderate	Moderate	Construction of the intake/ outfall and emergency outfall will be managed by good practice construction methods and any risk to the water body during construction is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. The greatest proportional change in the river flow regime would be increases in the low flow to extreme low flow conditions from the flow augmentation releases, with a change to the low flow envelope in the lower reaches of this water body. WRMP environmental studies have identified that the water body would not be subject to undue flow variability beyond its characteristic flow regime from the elevated baseflow due to the existing managed nature of the river. The River Thames habitat types most at risk from flow changes, specifically the change in low flows, are the weir pools due to the change in their level and flow regime. These areas are important nursery grounds for fish and provide diversity for of macroinvertebrates – however, the effect on the status of these in the water body as a whole would likely remain the same. The impact on macrophytes and phytobenthos status is uncertain due to lack of 2015 status classification but is considered unlikely to change as a result of scheme operation. Overall, it is expected that the ecological status will remain the same; further site specific surveys will be required to improve confidence in the assessment should this option be included in the WRMP Water would be abstracted from the river through fine screens to prevent fish entrainment. In-reservoir management measures, including control of the water releases draw off level, will minimise any potential river water quality issues in the River Thames from reservoir releases relating to water temperature, dissolved oxygen and algal biomass.				
	Macro-Invertebrates	Moderate	Moderate				
	Macrophytes & phytobenthos	Not assessed	Not assessed				
	Chemical (Overall)	Fail	Fail	The quality of the reservoir water released back into the river would be carefully managed as described above and the discharge would be subject to quality conditions set by the EA in the discharge permit to avoid deterioration to WFD chemical status. It is unlikely that the intermittent discharges would lead to a beneficial change to chemical status.			
	Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit. Drinking water protected area: The Thames (Evenlode to Thame) is a drinking water protected area. The risk to a change in chemical status is low.					

		Little Wittenham SAC: As there will be no flow variability beyond its characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is assessed as negligible.
	Does the component comply with WFD Objective	
	1. No deterioration between status classes	Yes; no deterioration between classes.
	2. No impediments to GES/GEP	Yes; no impediments to GES.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; water bodies downstream; Thames Wallingford to Caversham GB106039030331, Thames (Reading to Cookham) GB106039023233; Thames (Cookham to Egham) GB106039023231 and Thames (Egham to Teddington) GB106039023232 assessed below as compliant
	5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Thames Wallingford to Caversham		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD water body ID**	GB106039030331
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measure	Additional treatment to reduce concentrations of phosphate from Stewkley sewage treatment works		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	YES	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** none		
	Operation: Change in flow regime due to impacts on upstream water body.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The greatest proportional change in the flow regime would be increases in the low flow to extreme low flow conditions from river regulation releases to the upstream water body, with a change to the low flow envelope throughout this water body. There is more flow accretion (e.g. from the River Thame) in this water body and therefore the effects of the releases would be proportionally lower than the upstream water body and there will be no undue flow variability beyond its characteristic flow regime from the elevated baseflow due to the existing regulated nature of the river in this water body. The effects on the water body relating to water quality and risk to weir pool habitats are similar to the upstream water body (see table above).
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Good	Good	
Chemical (Overall)	Good	Good	The discharges from the reservoir to the upstream water body would be subject to conditions set by the EA in the discharge permit and therefore the risk to deterioration in WFD status is assessed as low.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit. Little Wittenham SAC: As there will be no flow variability beyond its characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is assessed as negligible.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; water bodies downstream; Thames (Reading to Cookham) GB106039023233; Thames (Cookham to Egham) GB106039023231 and Thames (Egham to Teddington) GB106039023232 assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Thames (Reading to Cookham)			
WFD water body type	River			
WFD management catchment	Thames and South Chilterns		**WFD water body ID**	GB106039023233
River Basin District	Thames			

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None		
	Operation: Change in flow regime due to impacts on upstream water bodies.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The greatest proportional change in the flow would be increases in the low flow to extreme low flow regime from the regulation release further upstream, with a change to the low flow envelope throughout this water body. There is more flow accretion in this water body (e.g. River Kennet and River Loddon) and therefore the effects of the flow augmentation releases further upstream would be proportionally lower in this water body and there will be no undue flow variability beyond its characteristic flow regime from the elevated baseflow due to the existing regulated nature of the river. The effects on this water body relating to water quality and risk to weir pool habitats are similar to the upstream water bodies (see above tables).
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	The discharges from the reservoir to the upstream water body would be subject to conditions set by the EA in the discharge permit and therefore the risk to deterioration in WFD status is assessed as low.
Protected Area Details		Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit controlling the flow augmentation releases to the river upstream.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; water bodies downstream; Thames (Cookham to Egham) GB106039023231 and Thames (Egham to Teddington) GB106039023232 assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Thames (Cookham to Egham)			
WFD water body type	River			
WFD management catchment	Maidenhead and Sunbury	**WFD water body ID**	GB106039023231	
River Basin District	Thames			

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None. **Operation:** Change in flow regime due to impacts on upstream water bodies.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The re-abstraction of the augmentation release water would commence in this water body. Changes in flow in the water body from operation of the scheme will partly reflect flow augmentation and partly the re-abstraction: the increase in the extreme low flow regime (after accounting for partial re-abstraction of the augmentation release water) would be less than that for the upstream water bodies. No impacts on ecological status are anticipated in this water body.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	High	High	
Chemical (Overall)	Good	Good	The discharges from the reservoir to the upstream water body would be subject to conditions set by the EA in the discharge permit and therefore the risk to deterioration in WFD status is assessed as low.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit for the upstream discharge of augmentation flows from the reservoir. Drinking water protected area: The water body is a drinking water protected area. The risk to a change in chemical status is assessed as low. South West London water bodies SPA and Ramsar: the SPA comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there are no impact pathways associated with the flow augmentation.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; water body downstream; Thames (Egham to Teddington) GB106039023232 assessed below as compliant
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Thames (Egham to Teddington)		
WFD water body type	River		
WFD management catchment	Maidenhead and Sunbury	**WFD water body ID**	GB106039023232
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body		**Construction:** None	
		Operation: Change in flow regime due to impacts on upstream water bodies.	
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Changes in flow in the water body from operation of the scheme will partly reflect flow augmentation and partly the re-abstraction: the increase in the extreme low flow regime (after accounting for partial re-abstraction of the transfer) would be less than that shown for the upstream water bodies. At the end of this water body, at the tidal limit at Teddington Weir, downstream of Thames Water's abstraction intakes, the very low flow to extreme low flow regime would return to the baseline conditions without the flow augmentation releases from the reservoir, with the same range and frequency of pass-forward flows into the Thames Tideway. The scheme is assessed as having a negligible effect on the flow regime throughout this water body. No change in ecological status anticipated as the flows would return to the baseline conditions in this water body and therefore not impact on fish, macroinvertebrates or macrophytes & phytobenthos.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	The discharges from the reservoir to the upstream water body would be subject to conditions set by the EA in the discharge permit and therefore the risk to deterioration in WFD status is assessed as low.
Protected Area Details		Drinking water protected area: The water body is a drinking water protected area. The risk to a change in chemical status is low. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit for flow augmentation releases from the reservoir. South West London water bodies SPA and Ramsar: the SPA comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there are no impact pathways from the flow augmentation.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no impacts on downstream water bodies as no change in moderate or low flows to the downstream transitional water body (Upper Thames Tideway) and negligible change to high flows.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Reuse - Reuse Beckton 100 Ml/d - RES-RU-BEC-100

water body

WFD water body name	Thames Middle		
WFD water body type	Transitional Water		
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911402
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	49.Modify vessel design 50.Vessel Management 26.Sediment management 27. Dredge disposal site selection 28.Manage disturbance	21.Avoid the need to dredge 22.Dredging disposal strategy 23.Reduce impact of dredging 24.Reduce sediment resuspension 25.Retime dredging or disposal	

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the treatment works will be within the existing Beckton STW site and this has been screened out of the WFD assessment. Temporary effects due construction of the treatment works will not cause deterioration of the water body due to the distance from the water body and the ability to manage risk through good practice construction methods. **Operation:** A reduction in the volume of treated effluent to the Thames Middle water body. It is currently expected that the existing final effluent discharge permit for Beckton STW discharge should not require amendment as a consequence of this scheme.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	Reduction in volume of treated effluent from Beckton STW. Potential for local increases in salinity in the Middle Tideway due to the reduced 'freshwater' discharge, but assessed as insufficient to adversely affect aquatic ecology. Therefore, no significant impacts are expected on the ecology of this water body.
Invertebrates	Good	Good	
Macroalgae	Good	Good	
Phytoplankton	High	High	
Angiosperms	Moderate	Moderate	
Chemical (Overall)	Good	Good	Reduction in volume of treated effluent from Beckton STW and accompanying reduction in the load of chemicals discharged. However, this is considered insufficient to affect the concentration of chemicals once diluted and dispersed. Therefore, no risk of deterioration and limited scope for improvement in chemical status at a water body scale.

Protected Area Details	Nutrient sensitive areas (Nitrate vulnerable zones): The transitional water body is associated with a nutrient sensitive area; however, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Thames Estuary & Marshes SPA (and Ramsar): The closest part of the site is approximately 24km from Beckton. Given the distance and the fact that no significant water quality or hydrodynamic changes are expected, there will be no impact on this European site.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Reuse – IPR Reuse Beckton 100 Ml/d x 3 to get 300 Ml/d - RES-RU-BEC-100

water body

WFD water body name	Thames Middle		
WFD water body type	Transitional Water		
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911402
River Basin District	Thames		

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	49.Modify vessel design 50.Vessel Management 26.Sediment management 27. Dredge disposal site selection 28.Manage disturbance	21.Avoid the need to dredge 22.Dredging disposal strategy 23.Reduce impact of dredging 24.Reduce sediment resuspension 25.Retime dredging or disposal	

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the treatment works will be within the existing Beckton STW site and this has been screened out of the WFD assessment. Temporary effects due construction of the treatment works will not cause deterioration of the water body due to the distance from the water body and the ability to manage risk through good practice construction methods.		
	Operation: A reduction in the volume of treated effluent to the Thames Middle water body, in three phases, each providing 100 Ml/d for reuse. It is currently expected that the existing final effluent discharge permit for Beckton STW discharge should not require amendment as a consequence of this scheme.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	Reduction in volume of treated effluent from Beckton STW, which currently discharges 1,111 Ml/d (dry weather flow) to the tidal Thames. Initial evaluation suggests that more than a 15-20% reduction in total freshwater inputs (equivalent to 275-365 Ml/d) to the middle Tideway over a period of several months could see a noticeable change in the salinity regime of the middle Tideway. A prolonged period of salinity increases resulting from freshwater reductions above the level indicated could change community structure in biological elements including benthic macroinvertebrates and fish. These studies indicate that the third phase of the 3 x 100 Ml/d scheme could reduce freshwater inputs to the level where some major biological effects may be seen and these could result in a deterioration in WFD status, although there is a degree of uncertainty involved. The initial two phases of the scheme (up to 2 x 100 Ml/d) would be unlikely to impact on WFD status.
Invertebrates	Good	Good	
Macroalgae	Good	Good	
Phytoplankton	High	High	
Angiosperms	Moderate	Moderate	
Chemical (Overall)	Good	Good	Reduction in volume of treated effluent from Beckton STW and accompanying reduction in the load of chemicals discharged. However, this is considered insufficient to affect the concentration of chemicals once diluted and dispersed. Therefore, no risk of deterioration and limited scope for improvement in chemical status at a water body scale.
Protected Area Details	Nutrient sensitive areas (Nitrate vulnerable zones): The transitional water body is associated with a nutrient sensitive area; however, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. Thames Estuary & Marshes SPA (and Ramsar): The closest part of the site is approximately 24km from Beckton. Given the distance and the fact that no significant water quality or hydrodynamic changes are expected, there will be no impact on this European site.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Uncertain; initial review indicates the third phase of the 3 x 100 Ml/d could cause between class deterioration. Further baseline understanding of salinity regime of middle Tideway and sensitivity of infauna communities required
2. No impediments to GES/GEP	No; potential impediment to Good status
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.

	5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Reuse - Reuse Beckton 150 Ml/d - RES-RU-BEC-150

Water body

WFD water body name	Thames Middle			
WFD water body type	Transitional Water			
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911402	
River Basin District	Thames			

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	49.Modify vessel design 50.Vessel Management 26.Sediment management 27. Dredge disposal site selection 28.Manage disturbance	21.Avoid the need to dredge 22.Dredging disposal strategy 23.Reduce impact of dredging 24.Reduce sediment resuspension 25.Retime dredging or disposal	

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the treatment works will be within the existing Beckton STW site and this has been screened out of the WFD assessment. Temporary effects due construction of the treatment works will not cause deterioration of the water body due to the distance from the water body and the ability to manage risk through good practice construction methods. **Operation:** A reduction in the volume of treated effluent to the Thames Middle water body. It is currently expected that the existing final effluent discharge permit for Beckton STW discharge should not require amendment as a consequence of this scheme.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	Reduction in volume of treated effluent. Potential for local increases in salinity in the Middle Tideway, but this is assessed as insufficient to affect aquatic ecology. Overall, no significant impacts are assessed to the local aquatic ecology which is tolerant of salinity variability of this scale.
Invertebrates	Good	Good	
Macroalgae	Good	Good	
Phytoplankton	High	High	
Angiosperms	Moderate	Moderate	
Chemical (Overall)	Good	Good	Reduction in volume of treated effluent and accompanying reduction in the load of chemicals discharged. However, this reduction is insufficient to affect estuary concentrations of chemicals once diluted and dispersed. Therefore, no risk of deterioration and limited scope for improvement in chemical status at a water body scale.

Protected Area Details	Nutrient sensitive areas: The transitional water body is associated with a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, no significant changes in water quality are expected. Thames Estuary & Marshes SPA (and Ramsar): The closest part of the site is approximately 24km from Beckton. Given the distance and the fact that no significant water quality or hydrodynamics are expected, there will be no impact on this European site.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Reuse - Reuse Deephams 46.5 Ml/d - RES-RU-DPH

water body

WFD water body name	Pymmes and Salmon Brooks - Deephams STW to Tottenham Locks		
WFD water body type	River		
WFD management catchment	London	**WFD water body ID**	GB106038027910
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-

Hydromorphological designation	heavily modified
Water Body Mitigation Measures	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

Scheme components potentially affecting water body	**Construction:** Construction of the treatment works will be within the existing Deephams STW site.
	Operation: A reduction in the volume of treated effluent to the river system due to diversion of up to 46.5 Ml/d for re-use.

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Construction will be managed by good practice construction methods and any risk to the water body is assessed as low. Temporary effects due to construction of the treatment works will not cause deterioration of the water body. Reduction in volume of treated effluent is significant (~20% of the permitted DWF). There is the potential for the buffering capacity of the water body to be reduced, however this will not be significant. Overall, there should be no significant impacts to the ecology. There is no 2015 assessment for fish status but it is considered unlikely that the scheme would lead to a deterioration in fish status for this water body.
Macro-invertebrates	Poor	Poor	
Macrophytes & Phytobenthos	Moderate	Moderate	
Chemical (Overall)	Good	Good	No change in the discharged effluent quality is expected and therefore risk of deterioration in chemical status is unlikely.
Protected Area Details		Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit controls.	

Does the component comply with WFD Objective

1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies including the River Lee Tottenham Locks to Bow Locks/Three Mill Locks assessed below.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Lee (Tottenham Locks to Bow Locks/Three Mills Locks)		
WFD water body type	River		
WFD management catchment	London	**WFD water body ID**	GB106038077852
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Bad	-	Moderate
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	Misconnections rectification for polluted SWT		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None		
	Operation: A reduction in the volume of treated effluent to the river system due to diversion of up to 46.5 Ml/d for re-use.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Bad	Bad	Reduction in volume of treated effluent will reduce flow in the River Lee noting that such flows are modified. Overall, there should be no significant impacts to the ecology of this heavily modified and flow managed water body. It is considered unlikely that the scheme would lead to a deterioration in fish status for this water body (current status is bad). Further investigation is required to confirm this assessment including the potential need for mitigation measures
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Moderate	Moderate	
Chemical (Overall)	Good	Good	No change in the discharged effluent quality is expected and therefore risk of deterioration in chemical status is unlikely.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit controls. Lee Valley SPA (and Ramsar): This site comprises a series of wetlands and reservoirs. Given the effluent will be treated to a high standard to protect water quality in the river and the Lee Valley reservoirs, there is unlikely to be an impact on this European site.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes, although the effect of flow change on biology and physico-chemical elements will be investigated further by Thames Water.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; following consideration of likelihood of potential effects on the Thames Middle TRAC water body (GB530603911402), noting the effect of pass-forward flow change will be investigated further by Thames Water.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Conveyance: Raw Water Systems: Medmenham Intake – 80Ml/d SWA South CON-RWS-SWA-MMM

Water body

WFD water body name	Thames (Reading to Cookham)		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD water body ID**	GB106039023233
River Basin District	Thames		

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the abstraction intake **Operation:** Abstraction of 80Ml/d water from the River Thames, assumed supported by a river regulation option (South East Strategic Reservoir Option Reservoir or Severn Thames Transfer). Abstraction will be subject to licence granted by the Environment Agency. Raw water will be treated and transferred to Widdenton SR		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Construction of the intake will be managed by good practice construction methods and any risk to the water body during construction is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. The greatest proportional change in the river flow regime would be reductions in the low flow to extreme low flow conditions from the abstraction, with a reduction in low flow downstream of the intake, in the middle and lower reaches of this water body. Local to the abstraction, indicative flows derived from upstream or downstream gauged data indicate (without supporting regulation) a maximum of 10% reduction in summer very low flows (Q99), less than 10% reduction in year-round low flows (Q95) and ~2-3% reduction in year-round moderate flows (Q50). The River Thames habitat types most at risk from flow changes, specifically the change in low flows, are the weir pools due to the change in their level and flow regime. These areas are important nursery grounds for fish and provide diversity for of macroinvertebrates – however, the effect on the status of these in the water body as a whole would likely remain the same. The impact on macrophytes and phytobenthos status is uncertain due to lack of 2015 status classification but is considered unlikely to change as a result of scheme operation. Overall, it is expected that the ecological status will remain the same; however there is some uncertainty in this assessment including the local reduction in dilution of discharges, and further site specific surveys will be required to confirm the assessment should this option be included in the WRMP Water would be abstracted from the river through fine screens to prevent fish entrainment.
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	The minor reduction in dilution would require confirmation that existing discharges would not lead to deterioration in WFD status. At present the risk to deterioration in WFD status is assessed as low.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.

	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; no impacts on downstream water bodies.
	5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Raw water transfer support: Transfer of Minworth Effluent 115 Ml/d - RES-RWTS-MIN

Water body

WFD water body name	Tame - R Rea to R Blythe		
WFD water body type	River		
WFD management catchment	Tame Anker and Mease	**WFD water body ID**	GB104028046841
River Basin District	Humber		

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-

Hydromorphological designation	Heavily modified
Water Body Mitigation Measure	No published mitigation measures

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A
	Operation: Cessation of final effluent inputs (115 Ml/d) from Minworth WwTW to River Tame

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Poor	Uncertain	The cessation of 115 Ml/d final effluent inputs from Minworth WwTW has the potential to have a major impact on the river's hydrological regime, since it would drastically restrict the river's Q95 flows. Decrease in flows resulting from diversion of discharge could exacerbate low flow conditions, reducing available habitat for fish. However, assuming flows would be protected by the hands-off flow constraint (197Ml/d at Water Orton), there should be no material adverse effects on fish populations (this being the only ecological element which is assessed). Further investigation is required to determine, with more certainty, likely impact under low flow conditions.
Macro-invertebrates	Not assessed	Not assessed	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Fail	Fail	There is negligible risk of deterioration between chemical status classes, the river is already failing to achieve good chemical status due to zinc and nickel inputs. The removal of FE from the waterbody may lead to improvements to water quality, however it is unlikely this may lead to an improvement in WFD status.

Protected Area Details	Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Uncertain; there is a risk of deterioration between status classes; further assessment required including development of additional mitigation measures if required to secure compliance.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of protected area objectives.

Water body

WFD water body name	Avon (Warks) - conf R Leam to Tramway Br		
WFD water body type	River		
WFD management catchment	Avon Warwickshire	**WFD water body ID**	GB109054044402
River Basin District	Severn		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	Good

Hydromorphological designation	Not designated artificial or heavily modified
Water Body Mitigation Measure	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

Scheme components potentially affecting water body	**Construction:** New 29 km pipeline and discharge to the River Avon (Warks) - conf R Sowe to conf R Leam.
	Operation: Transferring 115 Ml/d of treated effluent from Minworth STW to River Avon with corresponding cessation of final effluent discharged to the River Tame (GB104028046841)

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Uncertain	Construction of the pipeline and new discharge outlet will be managed by good practice construction methods and any risk to the water body is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. The proposed 115 Ml/d transfer of final effluent to the River Avon may have an adverse impact on the hydrological regime and may pose a risk of flooding in this stretch of the River Avon. These modification in flow regime may also have an adverse impact on macro-invertebrate communities. Effluent inputs may lead to a deterioration in water quality, especially during low flow conditions, which in turn may have adverse impacts on the ecology (especially macro-invertebrates). Further evidence and assessment required. These impacts may be mitigated by employing additional treatment of the effluent prior to its discharge. The scheme currently assumed RO process to be the preferred method to improve effluent quality and the scheme will need to be agreed and consented/licensed by the Environment Agency to ensure no deterioration to WFD ecological status. Further assessment is required to address uncertainties around the scheme's impacts on the hydrological regime and water quality of the river Avon.
Macro-invertebrates	Good	Uncertain	
Macrophytes & Phytobenthos	Moderate	Moderate	
Chemical (Overall)	Good	Uncertain	Further assessment of the pollutant concentrations in the treated effluent is required given that Minworth WwTW effluent is currently suspected to be one of the factors contributing to chemical WFD status failure in the River Tame.

Protected Area Details	Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. River Avon (Wark) - conf R Leam to Tramway Br) is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit controls.

Does the component comply with WFD Objective

1. No deterioration between status classes	Uncertain; potential deterioration between status classes; further assessment required including development of additional mitigation measures if required to secure compliance. Delivery of the required mitigation measures may be challenging.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on other waterbodies
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of protected area objectives.

Resource: Raw water transfer support - Netheridge Final Effluent Transfer - RES-RWTS-NTH

Waterbody

WFD water body name	Severn - conf R Avon to conf Upper Parting		
WFD water body type	River		
WFD management catchment	Severn Vale	**WFD waterbody ID**	GB109054044404
River Basin District	Severn		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-

Hydromorphological designation	Heavily modified
Water Body Mitigation Measure	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A **Operation:** Transfer of effluent (35 Ml/d) from Netheridge WwTW to R Severn conf R Avon to conf Upper Parting

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The input of final effluent from Netheridge WwTW is not expected to have any detrimental impacts on the flow regime or water quality in a waterbody of this size. Based on Q50 exceedance at Deerhurst GS, average flows will be increased by a mere 0.6% and therefore, no adverse impact on the flow regime.
Macro-invertebrates	Poor	Poor	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	No risk of deterioration between chemical status classes and limited scope for improvement in chemical status at a water body scale.

Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Severn - conf R Avon to conf Upper Parting is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no adverse changes in water quality are expected.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no risk of deterioration
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Raw water transfer support: Vyrnwy Transfer to Severn Trent Water 12Ml/d - RES-RWTS-SHR-12

Waterbody

WFD water body name	Severn - conf Bele Bk to conf Sundorne Bk		
WFD water body type	River		
WFD management catchment	Severn Uplands	**WFD waterbody ID**	GB109054049142
River Basin District	Severn		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	Good
Hydromorphological designation	Not designated artificial or heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A
	Operation: Reduce abstraction from the Shrewsbury Intake on the River Severn by 30 Ml/d

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The scheme entails the reduction of abstraction from River Severn at the Shrewsbury intake by 30 Ml/d. This reduction will be enabled by a raw water transfer between Vyrnwy Reservoir and Oswestry, an area supplied by the abstraction at Shrewsbury. There will be no change in the operational pattern in Vyrnwy Reservoir, the water volume being part of the existing abstraction. Reducing the abstraction at Shrewsbury will allow more water to flow along the Severn until the intake at Deerhurst, where an additional 12 Ml/d will be abstracted. The additional volume of water will have a beneficial impact on flows in the River Severn and will not constitute a significant increase in flows above the normal flow range expected in a waterbody of this size.
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Moderate	Moderate	
Chemical (Overall)	Good	Good	There is no risk of deterioration between chemical status classes.
Protected Area Details	Drinking Water Protected Area: the water body (Severn - conf Bele Bk to conf Sundorne Bk) is a Drinking Water Protected Area but there is negligible risk of adversely affecting the chemical status at water body scale. Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone and Severn - conf Bele Bk to conf Sundorne Bk is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area.		

Does the component comply with WFD Objective

1. No deterioration between status classes	Yes; no risk of deterioration
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Raw water transfer support Vyrnwy Transfer to Severn Trent Water 30Ml/d - RWP_STT UU/ST OPT B

Waterbody

WFD water body name	Severn - conf Bele Bk to conf Sundorne Bk		
WFD water body type	River		
WFD management catchment	Severn Uplands	**WFD waterbody ID**	GB109054049142
River Basin District	Severn		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	Good
Hydromorphological designation	Not designated artificial or heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	YES

Scheme components potentially affecting waterbody	**Construction:** N/A
	Operation: Reduce abstraction from the Shrewsbury Intake on the River Severn by 30 Ml/d

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The scheme entails the reduction of abstraction from River Severn at the Shrewsbury intake by 30 Ml/d. This reduction will be enabled by a raw water transfer between Vyrnwy Reservoir and Oswestry, an area supplied by the abstraction at Shrewsbury. There will be no change in the operational pattern in Vyrnwy Reservoir, the water volume being part of the existing abstraction. Reducing the abstraction at Shrewsbury will allow more water to flow along the Severn until the intake at Deerhurst, where an additional 12 Ml/d will be abstracted. The additional volume of water will have a beneficial impact on flows in the River Severn and will not constitute a significant increase in flows above the normal flow range expected in a waterbody of this size.
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Moderate	Moderate	
Chemical (Overall)	Good	Good	There is no risk of deterioration between chemical status classes.
Protected Area Details	Drinking Water Protected Area: the water body (Severn - conf Bele Bk to conf Sundorne Bk) is a Drinking Water Protected Area but there is negligible risk of adversely affecting the chemical status at water body scale. Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone and Severn - conf Bele Bk to conf Sundorne Bk is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no risk of deterioration
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Raw water transfer support: River Wye to Deerhurst 60 Ml/d - RES-RWTS-WYE-60.3

Waterbody

WFD water body name	Wye - Hampton Bishop to conf Kerne Br		
WFD water body type	River		
WFD management catchment	Wye MC	**WFD waterbody ID**	GB109055037112
River Basin District	Severn		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	Moderate	-

Hydromorphological designation	Not designated artificial or heavily modified
Water Body Mitigation Measure	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	YES	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** New 30.5 km pipeline between Ross-on-Wye and Deerhurst WTW
	Operation: 66.3 Ml/d raw water transfer from River Wye near Ross-on-Wye to Deerhurst WTW

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	There is the potential for adverse impact on the WFD status of flow sensitive ecological elements in the River Wye, as a result of abstracting up to 60.3 Ml/d at the Ross-on-Wye intake. Although water is available for abstraction within the Wye catchment, restrictions will apply during low flow conditions. Assuming these would be protected by the hands-off flow constraints and Elan Valley reservoir releases set out in the River Wye/Elan Valley Operating Agreement and associated abstraction licence conditions, there should be no material adverse effects on the ecology. However, further investigation is required to fully understand the frequency and duration of the scheme and to determine, with more certainty, the likely impact under low flow conditions with the existing Operating Agreement / abstraction licence conditions in the reach between Ross-on-Wye and Welsh Water's Monmouth abstraction, especially given the River Wye's SAC designation.
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Good	Good	There is no risk of deterioration between chemical status classes.

Protected Area Details	River Wye SAC: The main River Wye component of the SAC represents an important system providing habitats for a wide range of protected species such as sea, brook and river lamprey, twaite and allis shad, atlantic salmon, bullhead and otter. The river also supports *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. The scheme is considered unlikely to result in major adverse impacts on any of these designated features but Appropriate Assessment is required to confirm no adverse effects on site integrity after taking account of any additional mitigation measures that may be required (e.g. modifications to the Operating Agreement/abstraction licence conditions in relation to the low flow regime in the reach between Ross-on-Wye and Welsh Water's Monmouth abstraction). Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone and River Wye - Hampton Bishop to conf Kerne Br is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area.

Does the component comply with WFD Objective

1. No deterioration between status classes	Provisional assessment is YES but further evidence and assessment required by Dwr Cymru Welsh Water, including consideration of any required mitigation measures (such as changes to the River Wye/Elan Valley operating agreement and abstraction licence conditions) to maintain WFD status.
2. No impediments to GES/GEP	

	3. No compromises to water body objectives	Yes; no compromises to water body objectives
	4. No effects on other water bodies	Provisional assessment is YES but further evidence and assessment required by Dwr Cymru Welsh Water, including consideration of any required mitigation measures to maintain WFD status in downstream water body, assessed below.
	5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives

Waterbody

WFD water body name	Wye - conf Walford Bk to Bigsweir Br					
WFD water body type	River					
WFD management catchment	Wye MC			**WFD waterbody ID**	GB109055037111	
River Basin District	Severn					
WFD Designations, Objectives and Mitigation						
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**			
	Moderate	Good	-			
Hydromorphological designation	not designated artificial or heavily modified					
Water Body Mitigation Measure	No published mitigation measures					
WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	YES	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A		
	Operation: 66.3 Ml/d raw water transfer from River Wye near Ross-on-Wye to Deerhurst WTW		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	There is the potential for adverse impact on the WFD status of flow sensitive ecological elements in the River Wye, as a result of abstracting up to 60.3 Ml/d at the Ross-on-Wye intake. Although water is available for abstraction within the Wye catchment, restrictions will apply during low flow conditions. Assuming these would be protected by the hands-off flow constraints and Elan Valley reservoir releases set out in the River Wye/Elan Valley Operating Agreement and associated abstraction licence conditions, there should be no material adverse effects on the ecology. However, further investigation is required to fully understand the frequency and duration of the scheme and to determine, with more certainty, the likely impact under low flow conditions with the existing Operating Agreement / abstraction licence conditions in the reach between Ross-on-Wye and Welsh Water's Monmouth abstraction, especially given the River Wye's SAC designation.
Macro-invertebrates	Not assessed	Not assessed	
Macrophytes & Phytobentos	Moderate	Moderate	
Chemical (Overall)	Good	Good	There is no risk of deterioration between chemical status classes
Protected Area Details			River Wye SAC: The main River Wye component of the SAC represents an important system providing habitats for a wide range of protected species such as sea, brook and river lamprey, twaite and allis shad, atlantic salmon, bullhead and otter. The river also supports *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. The scheme is considered unlikely to result in major adverse impacts on any of these designated features but Appropriate Assessment is required to confirm no adverse effects on site integrity after taking account of any additional mitigation measures that may be required (e.g. modifications to the Operating Agreement/abstraction licence conditions in relation to the low flow regime in the reach between Ross-on-Wye and Welsh Water's Monmouth abstraction). Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone and River Wye - conf Walford Bk to Bigsweir Br is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area.

	Does the component comply with WFD Objective	
	1. No deterioration between status classes	Provisional assessment is YES but further evidence and assessment required by Dwr Cymru Welsh Water, including consideration of any required mitigation measures (such as changes to the River Wye/Elan Valley operating agreement and abstraction licence conditions) to maintain WFD status.
	2. No impediments to GES/GEP	
	3. No compromises to water body objectives	Yes; no compromises to water body objectives
	4. No effects on other water bodies	Yes; no effects on other waterbodies
	5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives

Conveyance: Raw Water System - South East Strategic Reservoir Option to Farmoor - (24 Ml/d) - CON-RWS-ABI-FMR

Waterbody

WFD water body name	Farmoor Reservoir		
WFD water body type	Lake		
WFD management catchment	Cotswolds	**WFD waterbody ID**	GB30641011
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	Good

Hydromorphological designation	Artificial
Water Body Mitigation Measure	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** Temporary construction of new discharge at Farmoor **Operation:** Raw water transfer of up to 24 Ml/d from new South East Strategic Reservoir to existing Farmoor Reservoir

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Temporary construction of the discharge structure will be managed by good practice construction methods and any temporary risks to the water body are assessed as low and will not cause WFD deterioration. This is an artificial water body and the biology has not been recently assessed. Littoral invertebrates were previously reported as High in 2013, phytoplankton as bad and chironomids (CPET) as bad. Total phosphorous was reported as poor. This being the case there is already the potential for algal bloom formation in this reservoir but this is not currently assessed for the purpose of WFD phytoplankton classification. Input water from South East Strategic Reservoir Option Reservoir is understood to originate from Cow Common Brook and Portobello Ditch (GB106039023360) which is currently classed as Poor for Phosphate and Poor for Macrophytes and Phytobenthos combined. The transfer is thought unlikely to further deteriorate phosphate status at a waterbody scale. The proposed raw water transfer poses a potential risk of invasive non-native species spread and further assessment is required to quantify this risk.
Littoral invertebrates	Not assessed	Not assessed	
Chironomids (CPET)	Not assessed	Not assessed	
Angiosperms	Not assessed	Not assessed	
Phytoplankton	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	There is no risk of deterioration between chemical status classes.
Protected Area Details		Drinking Water Protected Area: the water body (Farmoor Reservoir) is a Drinking Water Protected Area but there is negligible risk of adversely affecting the chemical status at water body scale. Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. Farmoor Reservoir is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between status classes, further assessment required.
2. No impediments to GES/GEP	Yes; no impediments to Good Ecological Potential.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.

Conveyance: Raw Water Systems - New Medmenham Intake (53) - CON-RWS-MMM-53

Waterbody

WFD water body name	Thames (Reading to Cookham)			
WFD water body type	River			
WFD management catchment	Thames and South Chilterns	**WFD waterbody ID**	GB106039023233	
River Basin District	Thames			

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** New abstraction intake, water treatment works and pipeline to new service reservoir **Operation:** A new 53 Ml/d abstraction from River Thames

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Temporary construction of the intake structure, water treatment works and pipeline will be managed by good practice construction methods and any temporary risks to the water body are assessed as low and will not cause WFD deterioration. The new abstraction from River Thames is unlikely to result in adverse impacts on the flow regime, water quality and ecology of the waterbody. The abstraction account for a mere 4% of Q95 flows, hence there is a negligible risk of deterioration to WFD status.
Macro-invertebrates	High	High	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	There is a negligible risk of deterioration between chemical status classes.

Protected Area Details	Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. River Thames (Reading to Cookham) is designated as a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between status classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.

Resource: Aquifer Storage & Recovery - Horton Kirby - RES-ASR-HTK

Waterbody

WFD waterbody name	West Kent Darent and Cray Chalk	**WFD waterbody ID**	GB40601G50 1800
WFD waterbody type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	-	-
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A **Operation:** 5 Ml/d abstraction from the chalk borehole will be used to support aquifer recharge in the Lower Greensand confined aquifer [non-WFD aquifer] borehole.		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Poor	-	
Dependent Surface Water Body Status	Poor	Poor	There is no risk of adversely affecting surface waterbodies as the abstraction from the chalk aquifer is within licence and uses water which is treated and stored in the Lower Greensand Aquifer for re-abstraction.
GWDTEs test	Good	Good	There are no impacts on any GWDTEs associated with the groundwater body
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Poor	Poor	The abstraction will not affect the water balance on a groundwater body scale.
Chemical (Overall)	Poor	Poor	No risk of deterioration in chemical status at a groundwater body scale.
Protected Area Details	Drinking Water Protected Area: the water body (West Kent Darent and Cray Chalk) is a Drinking Water Protected Area but there is a negligible risk of adversely affecting the chemical status at the groundwater body scale. Nutrient Sensitive Areas: The groundwater body is associated with a surface water nitrate vulnerable zone. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between status classes.		
2. No impediments to GES/GEP	Yes; no impediments to Good Status		
3. No compromises to water body objectives	Yes; no compromises to water body objectives.		
4. No effects on other water bodies	Yes; no effects on other water bodies.		
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.		

Resource: Groundwater – Groundwater Datchet 5.7 Ml/d - RES-GW-DAT

water body

WFD water body name	Thames (Cookham to Egham)					
WFD water body type	River					
WFD management catchment	Maidenhead to Sunbury			**WFD water body ID**	GB106039023231	
River Basin District	Thames					
WFD Designations, Objectives and Mitigation						
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**			
	Moderate	-	-			
Hydromorphological designation	heavily modified					
Water Body Mitigation Measures	No published mitigation measures					
WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A		
	Operation: Abstraction is within a confined aquifer [non-WFD aquifer] overlain by this river water body.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	The abstraction would be from the confined chalk aquifer. The hydrological assessment, including groundwater modelling results, indicates there is a negligible risk of impact on flows in the Thames (Cookham to Egham) (GB106039023231) due to drawdown from the boreholes(s). Due to the negligible surface hydrological impact (<1% change in the Q95 of the 3km stretch of Thames) there will not be a deterioration in ecological status.
Macro-invertebrates	Good	Good	
Macrophytes & Phytobenthos	High	High	
Chemical (Overall)	Good	Good	Given the negligible reductions in flow in the Thames, the chemical status is not expected to deteriorate.
Protected Area Details	Drinking water: The water body is a drinking water protected area but there is unlikely to be a change in water quality as a result of the scheme. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected. South West London water bodies SPA and Ramsar: the site comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the SPA because there will be no net change to water levels in the supply reservoirs that form part of this European site.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Groundwater – Honor Oak – 2.8 Ml/d – RES-GW-HON

Waterbody

WFD water body name	Ravensbourne (Catford to Deptford)		
WFD water body type	River		
WFD management catchment	London	**WFD waterbody ID**	GB106039023270
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	Good

Hydromorphological designation	heavily modified
Water Body Mitigation Measure	No published mitigation measures

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	NO	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A
	Operation: Increase in abstraction - approximately 1 Ml/d

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Bad	Bad	The abstraction would be from the confined chalk aquifer although some connectivity with the Greenwich Tertiaries and Chalk (GB40602G602500) waterbody may be expected. The small increase in abstraction is unlikely to have any adverse impacts on flows in the Ravensbourne River, assuming only limited connectivity exists between the confined chalk and the Greenwich Tertiaries. Further assessment would be required to confirm this preliminary assessment.
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	Given the negligible risk to flows, chemical status is not expected to deteriorate.

Protected Area Details	None

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes; further assessment required to establish connectivity between the two aquifers
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Inter-Zonal Transfer: Henley to SWA – 2.37 Ml/d - RES-IZT-HEN-SWA-HAM-2.37

Water body

WFD water body name	Maidenhead Chalk	**WFD water body ID**	GB40601G602600
WFD water body type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

	RBMP2 Overall Status	Objective (2021)	Objective (2027)
WFD Status and Objectives	Good	-	-
Water Body Mitigation Measures	No updated published mitigation measures		

WFD Protected Areas

Bathing Water Directive	Drinking Water Directive	Conservation of Wild Birds Directive	Habitats Directive	Nitrates Directive	Shellfish Directive	Urban Waste Water Treatment Directive
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None **Operation:** This transfer is based on the surplus within current licences in Henley, so the assumption is that no changes to licence quantities in Henley Zone will be needed		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Good	-	
Dependent Surface water body Status	Good	Good	Previous hydrogeological assessment undertaken for TW WRMP14 and looking to disaggregate and licence a Chalk aquifer abstraction at Sheeplands of 18 Ml/d suggested that drawdown would not be significantly affected due to the supporting interaction between River Thames and groundwater at this location. The extent of flow change in the River Thames, assuming full connectivity is negligible compared with river flow locally. There are no known Natura 2000 or SSSI groundwater dependent habitats associated with the ground water body. Given distances from the sea, saline intrusion is unlikely. The abstraction will not affect the ground waterbody's chemical status.
GWDTEs test	Good	Good	
Saline Intrusion	Good	Good	
Water Balance	Good	Good	
Chemical (Overall)	Good	Good	
Protected Area Details	Drinking water: The groundwater body is a drinking water protected area but there is unlikely to be a change in water quality as a result of the scheme. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes.		
2. No impediments to Good Status	Yes; no impediments to Good Status		
3. No compromises to water body objectives	Yes; no compromises to water body objectives.		
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.		
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.		

Resource: Inter-Zonal Transfer: Henley to SWA – 5 Ml/d - RES-IZT-HEN-SWA-HAM-5

Water body

WFD water body name	Maidenhead Chalk	**WFD water body ID**	GB40601G602600
WFD water body type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Good	-	-
Water Body Mitigation Measures	No updated published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None **Operation:** This transfer is based on the surplus within current licences in Henley, so the assumption is that no changes to licence quantities in Henley Zone will be needed		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Good	-	
Dependent Surface water body Status	Good	Good	Previous hydrogeological assessment undertaken for TW WRMP14 and looking to disaggregate and licence a Chalk aquifer abstraction at Sheeplands of 18 Ml/d suggested that drawdown would not be significantly affected due to the supporting interaction between River Thames and groundwater at this location. The extent of flow change in the River Thames, assuming full connectivity is negligible compared with river flow locally. There are no known Natura 2000 or SSSI groundwater dependent habitats associated with the ground water body. No risk of saline intrusion. The abstraction will not affect the ground waterbody's chemical status.
GWDTEs test	Good	Good	
Saline Intrusion	Good	Good	
Water Balance	Good	Good	
Chemical (Overall)	Good	Good	
Protected Area Details	Drinking water: The groundwater body is a drinking water protected area but there is unlikely to be a change in water quality as a result of the scheme. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes.		
2. No impediments to Good Status	Yes; no impediments to Good Status		
3. No compromises to water body objectives	Yes; no compromises to water body objectives.		
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.		
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.		

Resource: Removal of Constraints - Britwell - RES-RC-BTW

Waterbody

WFD waterbody name	Vale of White Horse Chalk	**WFD waterbody ID**	GB40601G601000
WFD waterbody type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	-	-
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A		
	Operation: Recommissioning of abstraction at Britwell – 1.3 Ml/d		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Good	-	
Dependent Surface Water Body Status	Good	Uncertain	There is a risk of impacting flows in the Chalgrove Brook (GB106039023740) as a result of this groundwater abstraction. A separate assessment is provided below.
GWDTEs test	Good	Good	There are no impacts on any GWDTEs associated with the groundwater body
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Good	Good	The abstraction will not affect the water balance on a groundwater body scale
Chemical (Overall)	Poor	Poor	No risk of deterioration in chemical status at a groundwater body scale.
Protected Area Details	Drinking Water Protected Area: the water body (Vale of White Horse Chalk) is a Drinking Water Protected Area but there is a negligible risk of adversely affecting the chemical status at the groundwater body scale Nutrient sensitive areas: The ground water body is associated with a groundwater nitrate vulnerable zone; however, the scheme will not affect the management of the protected area.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes		
2. No impediments to GES/GEP	Yes; no impediments to Good Status.		
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.		
4. No effects on other water bodies	Uncertain, potential risk of deterioration in status classes for dependent surface waterbody Chalgrove Brook (GB106039023740), assessed separately below.		
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.		

Waterbody

WFD water body name	Chalgrove Brook		
WFD water body type	River		
WFD management catchment	Thames and South Chilterns	**WFD waterbody ID**	GB106039023740
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	Moderate
Hydromorphological designation	not designated artificial or heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

Scheme components potentially affecting waterbody	**Construction:** N/A
	Operation: Recommissioning of abstraction at Britwell – 1.3 Ml/d

WFD assessment (scoping)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Poor	Uncertain	There is a risk of impacting the flow regime and water quality in the Chalgrove Brook. This may directly affect fish and macroinvertebrates. Further, phosphorus status is currently 'poor' and any further decline in phosphorus status could have an adverse impact on the macrophytes & phytobenthos status, this being currently affected by high phosphorus loads linked to intermittent sewage discharges and agricultural runoff. Further investigation is required to establish the magnitude of drawdown and subsequent impacts on flows, dilution rates and ecology.
Macro-invertebrates	Poor	Uncertain	
Macrophytes & Phytobenthos	Moderate	Uncertain	
Chemical (Overall)	Good	Good	There is a negligible risk of deterioration between chemical status classes.
Protected Area Details		Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.	

Does the component comply with WFD Objective

1. No deterioration between status classes	Uncertain, potential risk of deterioration in status classes for all biological elements; further assessment required to determine the scale of possible impact on WFD status and to develop appropriate mitigation measures. Delivery of required mitigation measures could be challenging to secure WFD compliance.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.
4. No effects on other water bodies	Yes; no effects on other waterbodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.

Resource: Raw Water Transfer Support: Oxford Canal Transfer to Cropredy - 15Ml/d - RES-RWTS OXC-CRP-15

Waterbody

WFD waterbody name	Tame Anker Mease – Coal Measures Black Country	**WFD waterbody ID**	GB40402G992400
WFD waterbody type	Groundwater	**River Basin District**	Humber
WFD management catchment	Humber GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Good	Good	Good
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A		
	Operation: Increase in abstraction rate, within existing licence, at Bradley Boreholes by up to 15Ml/d (noting conjunctive use with Perry Well groundwater source)		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Good	-	
Dependent Surface Water Body Status	Good	Good	There is low risk of impacting flows in the headwaters of the River Tame - Tame (W/ton Arm) source to conf Oldbury (GB104028046930) as a result of this groundwater abstraction. A separate assessment is provided below.
GWDTEs test	Good	Good	There are no impacts on any GWDTEs associated with the groundwater body
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Good	Good	The abstraction will not affect the water balance on a groundwater body scale
Chemical (Overall)	Good	Good	No risk of deterioration in chemical status at a groundwater body scale.
Protected Area Details	Drinking Water Protected Area: the water body (Tame Anker Mease – Coal Measures Black Country) is a Drinking Water Protected Area but there is a negligible risk of adversely affecting the chemical status at the groundwater body scale from a small intermittent increase in abstraction rate. Nutrient sensitive areas: The ground water body is associated with a groundwater nitrate vulnerable zone; however, the scheme will not affect the management of the protected area.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes.		
2. No impediments to GES/GEP	Yes; no impediments to Good Status.		
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.		
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.		
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.		

Waterbody

WFD waterbody name	Tame Anker Mease – PT Sandstone Birmingham Lichfield	**WFD waterbody ID**	GB40401G301000
WFD waterbody type	Groundwater	**River Basin District**	Humber
WFD management catchment	Humber GW		

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	-	-
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A		
	Operation: Increase, within existing licence, in abstraction rate at Perry Well by up to ~1.7Ml/d (noting conjunctive use with Bradley Boreholes groundwater source) and maximum licence rate of 5.2Ml/d		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Poor	-	
Dependent Surface Water Body Status	Poor	Poor	There is low risk of impacting flows in the Tame – conf two arms to R Rea (GB104028046842) as a result of this groundwater abstraction. A separate assessment is provided below.
GWDTEs test	Good	Good	There are no impacts on any GWDTEs associated with the groundwater body
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Good	No change	The small, intermittent increase in abstraction rate will not affect the water balance on a groundwater body scale. However, the EA advise that their revised Birmingham Aquifer model has highlighted poor aquifer recharge rates at a water body scale and the water balance test will be revised down to Poor and mitigation measures introduced. The EA advise that increasing above recent actual abstraction rates at Perry Well may be considered to impede these developing mitigation measures and further investigation is required by the EA.
Chemical (Overall)	Poor	Poor	No risk of deterioration in chemical status at a groundwater body scale.
Protected Area Details	Drinking Water Protected Area: the water body (Tame Anker Mease – PT Sandstone Birmingham Lichfield) is a Drinking Water Protected Area but there is a negligible risk of adversely affecting the chemical status at the groundwater body scale from a small intermittent increase in abstraction rate. Nutrient sensitive areas: The ground water body is associated with a groundwater nitrate vulnerable zone; however, the scheme will not affect the management of the protected area.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes
2. No impediments to GES/GEP	Yes; no impediments to Good Status.
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives at present. Noting that the quantitative water balance test will be revised down by the EA, water body objectives will be reviewed by the EA. Additional supporting evidence to be developed by CRT and Thames Water working with the EA.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.

Water body

WFD water body name	Tame (W/ton Arm) source to conf Oldbury		
WFD water body type	River		
WFD management catchment	Tame Anker and Mease	**WFD water body ID**	GB104028046930
River Basin District	Humber		

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Bad	-	-
Hydromorphological designation	Heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A		
	Operation: Increase in groundwater abstraction from linked aquifer.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Not assessed	Previous hydro-geological assessment indicates there is a negligible risk of impact on flows in surface waters due to increased abstraction. This may require confirmation through pump testing.
Macro-invertebrates	Bad	Bad	
Macrophytes & Phytobenthos	Poor	Poor	
Chemical (Overall)	Fail	Fail	Given the current assessment of negligible reductions in flow in surface waters from increased abstraction, the chemical status is not expected to deteriorate.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes. Additional supporting evidence to be developed by CRT and Thames Water working with the EA.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Tame – conf two arms to R Rea		
WFD water body type	River		
WFD management catchment	Tame Anker and Mease	**WFD water body ID**	GB104028046842
River Basin District	Humber		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	Heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** N/A **Operation:** Increase in groundwater abstraction from linked aquifer.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Bab	Bad	Negligible risk of impact on flows in surface waters as increase in groundwater abstraction rate considered small and infrequent. This will be reviewed by EA through use of their revised Birmingham Aquifers model and pump testing if required.
Macro-invertebrates	Moderate	Moderate	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Fail	Fail	Given the current assessment of negligible reductions in flow in surface waters from increased abstraction, the chemical status is not expected to deteriorate.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes. Additional supporting evidence to be developed by CRT and Thames Water working with the EA.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Cherwell (Cropredy to Nell Bridge)		
WFD water body type	River		
WFD management catchment	Cherwell and Ray	**WFD water body ID**	GB106039037310
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		Not designated artificial or heavily modified	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None - using existing infrastructure to transfer between the Oxford Canal and the adjacent River Cherwell at Cropredy		
	Operation: Transfer of 15Ml/d canal-sourced water into the River Cherwell at Cropredy. Discharge will be subject to licence granted by the Environment Agency.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good (uncertain)	The scheme would lead to significant increases in river flow throughout the water body across the flow regime except at high flows. Local to the abstraction, indicative flows derived from downstream gauged data indicate that there is negligible flow under low and very low flow conditions, and moderate flow (Q50) of 37Ml/d (influenced by a dis-used, licenced abstraction – TWUL intake from the Cherwell to Grimsbury Reservoir). In mid- water body Banbury STW discharges a consented dry weather flow of 20.4Ml/d. (In October 2009, a low flow alleviation scheme was implemented whereby flow in the River Cherwell at Banbury was maintained at 10Ml/d by augmenting during abstraction using a compensation discharge from Banbury STW. However, abstraction to Grimsbury Reservoir ceased in 2010.) The quality of the transferred canal water is not known but is likely to be superior to that of Banbury STW treated effluent. Supporting water quality in the water body is currently assessed as High status for ammonia, but Moderate status for dissolved oxygen and Poor status for phosphate. Although the quality of the transferred canal water is not known (and would require further review) the additional flow is considered likely to improve the dissolved oxygen, particularly downstream of Banbury STW discharge. The phosphate quality of the transferred canal water is likely to be equivalent to Moderate status and may lead to an improvement in phosphate quality, particularly downstream of Banbury STW discharge. The general flow regime of the River Cherwell in this water body would increase, in particular during low flow conditions. Whilst antecedent low flows influence the composition of biological river communities, moving away from the current flow regime may not be detrimental to the overall fish and invertebrate community, particularly in the reach upstream of the Banbury STW discharge. Further investigation is required to ensure there is no detrimental impact on the status of fish and invertebrates across the water body and to determine whether this may in fact be likely to improve. Subject to further investigation, the impact on macrophytes and phytobenthos status is also uncertain. There would be likely flow increases, reducing the opportunity for ponding and algal growth (including nuisance species) and the potential for a reduction in phosphate concentration.
Macro-invertebrates	Moderate	Moderate (uncertain)	
Macrophytes & Phytobenthos	Moderate	Moderate (uncertain)	
Chemical (Overall)	Good	Good	The improvement in dilution of Banbury STW discharge would help safeguard the current Good status.
Protected Area Details		Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected. The Drinking Water Protection Area relates to Thames Water's abstraction for potable supply to Grimsbury Reservoir which is not in use.	
Does the component comply with WFD Objective			

	1. No deterioration between status classes	Yes; no likely deterioration between classes, although the effect of flow change on biology elements will be investigated by Thames Water.
	2. No impediments to GES/GEP	Yes; no impediments to GEP, subject to confirmation of the phosphate concentration of the transferred canal water.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; potential to affect downstream water body Cherwell (Nell Bridge to Bletchingdon): GB106039037431 assessed below as compliant
	5. Assists attainment of water body objectives	Yes; likely to assist achieving Good status for dissolved oxygen, with potential to assist invertebrates achieving Good status.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Cherwell (Nell Bridge to Bletchingdon)		
WFD water body type	River		
WFD management catchment	Cherwell and Ray	**WFD water body ID**	GB106039037431
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		Not designated artificial or heavily modified	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None **Operation:** Change in flow and water quality regime due to impacts on upstream water body.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good (uncertain)	The greatest proportional change to the river flow regime from the transfer would be increases in the low flow to extreme low flow conditions. Gauged data records (which include historic abstraction and discharge regimes previously contributing to the gauge) indicate a maximum of 30% increase in summer very low flows (Q99) and year-round low flows (Q95); with ~7% increase in year-round moderate flows (Q50). Supporting water quality in the water body is currently assessed as High status for ammonia, Good status for dissolved oxygen but Poor status for phosphate. The phosphate quality passed forward from the upstream water body may be improved by the transfer. The low flow regime of the River Cherwell in this water body would increase. However, moving away from the current degraded flow regime – heavily influenced by Banbury STW effluent augmented flows – may not be detrimental to the overall fish and invertebrate community. Further investigation is necessary to determine the effect on fish and invertebrates across the water body. Subject to further investigation, the impact on macrophytes and phytobenthos status is also uncertain. There would be likely flow increases, reducing the opportunity for ponding and algal growth (including nuisance species) and the potential for a reduction in phosphate concentration.
Macro-invertebrates	High	High (uncertain)	
Macrophytes & Phytobenthos	Moderate	Moderate (uncertain)	
Chemical (Overall)	Good	Good	The improvement in dilution of Banbury STW discharge in the upstream water body would help safeguard the current Good status.
Protected Area Details		Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.	

Does the component comply with WFD Objective

1. No deterioration between status classes	Yes; no likely deterioration between classes, although the effect of flow change on biology elements will be investigated by Thames Water.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; potential to affect downstream water body Cherwell (Bletchingdon to Ray): GB106039037432 assessed below as compliant
5. Assists attainment of water body objectives	Yes; likely to mildly assist achieving Good status for phosphate, with potential to assist macrophytes & phytobenthos achieving Good status.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

water body

WFD water body name	Cherwell (Bletchingdon to Ray)		
WFD water body type	River		
WFD management catchment	Cherwell and Ray	**WFD water body ID**	GB106039037432
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		Heavily modified	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** None **Operation:** Change in flow and water quality regime due to impacts on upstream water body.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good (uncertain)	The greatest proportional change to the river flow regime from the transfer would be increases in the low flow to extreme low flow conditions. Gauged data indicate (accounting for former abstraction and discharge regimes contributing to the gauge) a maximum of 30% increase in summer very low flows (Q99) and year-round low flows (Q95); with ~7% increase in year-round moderate flows (Q50). Supporting water quality in the water body is currently assessed as High status for ammonia and dissolved oxygen but Moderate status for phosphate. The phosphate quality passed forward from the upstream water body may be improved by the transfer. The low flow regime of the River Cherwell in this water body would increase. However, moving away from the current flow regime – heavily influenced by Banbury STW flows – may not be detrimental to the overall fish and invertebrate community. Further investigation is required to determine the effect on fish and invertebrates across the water body. Subject to further investigation, the impact on macrophytes and phytobenthos status is uncertain, however these elements were not assessed in 2015. There would be likely flow increases, reducing the opportunity for ponding and algal growth (including nuisance species) and the potential for a reduction in phosphate concentration.
Macro-invertebrates	Good	Good (uncertain)	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	The improvement in dilution of Banbury STW discharge in the upstream water body would help safeguard the current Good status.
Protected Area Details		Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive. The scheme will not significantly affect the management of the protected area and no significant changes in water quality are expected.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no likely deterioration between classes, although the effect of flow change on biology elements will be investigated by Thames Water.
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on water bodies downstream as flow and quality influence of upper Cherwell diminished by distance, flow accretion and input of River Ray prior to the downstream water body.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Oxford Canal Transfer to Dukes Cut - 15Ml/d – RES-RWTS-OXC-DKC-15

water body

WFD water body name	Thames (Evenlode to Thame)		
WFD water body type	River		
WFD management catchment	Gloucestershire and the Vale	**WFD water body ID**	GB106039030334
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	Not designated artificial or heavily modified		
Water Body Mitigation Measures	No published mitigation measures.		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	YES	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of outfall structure.		
	Operation: Transfer of 15Ml/d River Cherwell sourced water at Duke's Cut. Discharge will be subject to licence granted by the Environment Agency.		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Moderate	Moderate	Construction of the pipeline and outfall will be managed by good practice construction methods and any risk to the water body during construction is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. The greatest proportional change to the river flow regime from the transfer would be increases in the low flow to extreme low flow conditions. Flows upstream of the Farmoor Reservoir intake (Thames at Eynsham, naturalised) indicate that a 15Ml/d transfer would increase all very low flows by less than 10%, except on a handful of dates. Consequently, the influence of the transfer on biological elements is likely to be minimal. The transferred water quality would reflect that found in the River Cherwell at the offtake to Duke's Cut – in water body GB106039029800 – currently High status for ammonia, Good status for dissolved oxygen, Moderate status for phosphate and Good chemical status. The water quality influence of the transfer on the status of the River Thames is negligible. The effect of the transfer on the flow regime of the River Thames would be very minor and considered negligible once the equivalent flow has been re-abstracted to Farmoor Reservoir. Noting the very minor local flow change and negligible water quality change from the transfer, the effects on fish, invertebrates, macrophytes & phytobenthos have all been assessed as negligible.
Macro-Invertebrates	Moderate	Moderate	
Macrophytes & phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Fail	Fail	The quality of the water released back into the river would be carefully managed and the discharge would be subject to quality conditions set by the EA in the discharge permit to avoid deterioration to WFD chemical status. It is unlikely that the intermittent discharges would lead to a beneficial change to chemical status.
Protected Area Details	Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit. Drinking water protected area: The Thames (Evenlode to Thame) is a drinking water protected area. The risk to a change in chemical status is low. Little Wittenham SAC: As there will be no flow variability beyond its characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is assessed as negligible.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes.		
2. No impediments to GES/GEP	Yes; no impediments to GES.		

	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
	5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Resource: Removal of Constraints: Epsom - RES-RC-EPS

Waterbody

WFD waterbody name	Bromley Tertiaries	**WFD waterbody ID**	GB40602G602300
WFD waterbody type	Groundwater	**River Basin District**	Thames
WFD management catchment	Thames GW		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	RBMP2 Overall Status	Objective (2021)	Objective (2027)
	Poor	Good	-
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	NO	NO	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** New borehole and pipeline to existing WTW		
	Operation: New 2Ml/d abstraction from new Railway ABH (may increase to 4Ml/d)		
WFD Status Test	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Quantitative (Overall)	Poor	-	
Dependent Surface Water Body Status	Poor	Uncertain	There is a risk of impacting flows in the River Hogsmill (GB106039017440) as a result of the abstraction from the new as well as existing BHs. A separate assessment is provided below.
GWDTEs test	Good	Uncertain	Pond habitat at Stones Road Pond SSSI and lowland damp grassland habitat at Epsom and Ashtead Commons SSSI have been reviewed. Both are underlain by significant deposits of clay and are considered not connected to or controlled by groundwater. There are no GWDTE impacted by the abstraction.
Saline Intrusion	Good	Good	There is no risk of saline intrusion.
Water Balance	Good	Good	The abstraction is unlikely to affect the water balance on a groundwater body scale.
Chemical (Overall)	Good	Good	No risk of deterioration in chemical status at a groundwater body scale.
Protected Area Details	Drinking Water Protected Area: the water body (Bromley Tertiaries) is a Drinking Water Protected Area but there is a negligible risk of adversely affecting the chemical status at the groundwater body scale.		
Does the component comply with WFD Objective			
1. No deterioration between status classes	Yes; no deterioration between classes		
2. No impediments to GES/GEP	Yes; no impediments to Good Status.		
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.		
4. No effects on other water bodies	Uncertain; there is a potential to impact Hogsmill River (GB106039017440), assessed separately below		
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.		
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.		

Waterbody

WFD water body name	Hogsmill		
WFD water body type	River		
WFD management catchment	London	**WFD waterbody ID**	GB106039017440
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	Heavily modified		
Water Body Mitigation Measure	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	NO

WFD assessment (scoping)

Scheme components potentially affecting waterbody	**Construction:** N/A
	Operation: New 2Ml/d abstraction from new Railway ABH (may increase to 4Ml/d)

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Uncertain	There is a risk of additional abstraction further impacting the flow regime in the Hogsmill River by reducing baseflow contribution from the chalk aquifer outcrop at Ewell. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. Currently impacts are mitigated by 3rd party flow augmentation of a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of deterioration to ecological elements (fish and macro-invertebrates) is currently uncertain and further assessment is required.
Macro-invertebrates	Moderate	Uncertain	
Macrophytes & Phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Good	Good	There is a negligible risk of deterioration between chemical status classes.
Protected Area Details	Nutrient Sensitive Areas: The water body is associated with a surface water nitrate vulnerable zone. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected.		

Does the component comply with WFD Objective

1. No deterioration between status classes	Uncertain, potential risk of deterioration in status classes for fish and invertebrates; further planned assessment required as part of WINEP investigations in AMP7. These investigations may require some additional mitigation measures to be included such as additional abstraction licence conditions and/or increase to existing flow augmentation scheme. WFD compliance likely to be secured with application of any required mitigation measures.
2. No impediments to GES/GEP	
3. No compromises to water body objectives	Yes; no compromises to waterbody objectives.
4. No effects on other water bodies	Yes; no effects on other waterbodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any protected areas objectives.

Resource: Raw Water System Culham to Farmoor CON-RWS-CUL-FMR-180

water body

WFD water body name	Thames (Evenlode to Thame)		
WFD water body type	River		
WFD management catchment	Gloucestershire and the Vale	**WFD water body ID**	GB106039030334
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	not designated artificial or heavily modified		
Water body Mitigation Measure	No published mitigation measures.		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	NO	YES	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the abstraction intake **Operation:** Reservoir refill via abstraction of water from the River Thames. Abstraction subject to EA hands-off flow conditions for River Thames. No net change in abstraction rate from current Farmoor Reservoir abstraction licences.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Moderate	Moderate	Construction of the intake will be managed by good practice construction methods and any risk to the water body during construction is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. Reduction in high and moderate river flows, with the greatest proportional change in the flow regime would be reduction to the hands-off flow condition. However, as abstraction would be to the same rate as water left in the River Thames at current Farmoor Reservoir intake, limited overall effect on river flow downstream of Culham Water would be abstracted from the river through fine screens to prevent fish entrainment.
Macro-Invertebrates	Moderate	Moderate	
Macrophytes & phytobenthos	Not assessed	Not assessed	
Chemical (Overall)	Fail	Fail	There is a negligible risk of deterioration between chemical status classes.
Protected Area Details		Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. The scheme will not affect the management of the protected area. Drinking water protected area: The Thames (Evenlode to Thame) is a drinking water protected area. The risk to a change in chemical status is low. Little Wittenham SAC: As there will be no flow variability beyond its characteristic flow regime, the risk of any overtopping leading to the inundation with river water of ponds used by great crested newt is assessed as negligible.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no deterioration between classes.
2. No impediments to GES/GEP	Yes; no impediments to GES.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; no effects on other waterbodies.
5. Assists attainment of water body objectives	No; does not assist with the attainment of any mitigation water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

APPENDIX C:
WFD COMPLIANCE ASSESSMENT OUTCOMES FOR OPTIONS SELECTED IN THE SET OF "REASONABLE ALTERNATIVE" PROGRAMMES (STEP 3)

This section presents the outcomes of the WFD compliance assessment for those options selected within each of the "reasonable alternative" programmes as well as the preferred programme for the WRMP19. The options assessed are:

Option	Option included in "reasonable alternative" programme or Preferred Programme						
	Phased_LC	Multi-obj_RES	Multi-obj_FP	NearO_RES	NearO_TP	Min_IGEQ	Preferred Programme
Aquifer Storage and Recovery (ASR) Horton Kirby	✓	✓	✓	✓		✓	✓
AR SLARS Kidbrooke (SLARS1) 7 Ml/d		✓	✓				✓
AR Streatham (SLARS2) 5 Ml/d	✓	✓	✓			✓	
AR Merton (SLARS3) 5 Ml/d	✓	✓	✓	✓		✓	✓
ASR South East London (Addington) 1 Ml/d	✓	✓	✓	✓			
ASR South East London (Addington) 3 Ml/d							✓
ASR Thames Valley/Thames Central 3 Ml/d	✓	✓	✓	✓		✓	
Beckton Desalination 150	✓		✓	✓	✓	✓	
Beckton Reuse 200 Ml/d (phased 100)		✓					
Beckton Reuse 300 Ml/d (phased 150)			✓				
Chalkstream pipelines							✓
Chingford Raw Water Purchase	✓	✓	✓	✓	✓	✓	✓
Coppermills WTW extension 100 Ml/d	✓	✓	✓	✓	✓	✓	✓
Culham to Farmoor 180 Ml/d							✓
Deephams Reuse	✓		✓	✓		✓	✓
Didcot Raw Water Purchase	✓	✓	✓	✓	✓	✓	✓
Groundwater Addington 1 Ml/d	✓	✓	✓	✓		✓	✓
Groundwater Dapdune							✓
Groundwater Datchet 6Ml/d	✓	✓	✓	✓		✓	✓
Groundwater London confined Chalk (north) 2 Ml/d	✓		✓	✓		✓	
Groundwater Moulsford 1 - 3.5 Ml/d	✓	✓	✓	✓		✓	
Groundwater Southfleet/Greenhithe (new WTW) 8 Ml/d	✓	✓	✓	✓		✓	✓
Honor Oak		✓				✓	
ITZ_North SWX to SWA 72		✓					
ITZ_North SWX to SWA 48			✓				
Kempton WTW new 100 Ml/d	✓	✓	✓	✓	✓	✓	✓
Medmenham intake to SWA	✓			✓	✓	✓	✓
Merton Recommissioning	✓	✓	✓			✓	✓
New River Head - Removal of Constraints	✓	✓	✓	✓		✓	✓
NTC_Dapdune							✓
NTC_Ladymead (+ Shalford to Albury transfer main)							✓
Oxford Canal to Cropredy Resource 15 Ml/d	✓	✓	✓	✓		✓	✓
RC Ashton Keynes borehole pumps 2.5 Ml/d	✓	✓	✓	✓		✓	
RC Britwell 1.31 Ml/d	✓	✓	✓	✓		✓	
RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	✓	✓	✓	✓		✓	✓
Severn-Thames Transfer				✓			
Severn-Thames Transfer 1							✓
Severn-Thames Transfer 2		✓					
Severn-Thames Transfer 3			✓				
South East Strategic Reservoir Option 125Mm^3	✓		✓				
South East Strategic Reservoir Option 150Mm^3		✓			✓	✓	✓
Wessex to SWOX (Flaxlands)	✓	✓				✓	

Aquifer Storage and Recovery (ASR) Horton Kirby

Option assessed for compliance in the following WFD water bodies:

GB40601G501800 - West Kent Darent and Cray Chalk

Element Name	Element Reference	Risk of deterioration of WFD status
Horton Kirby	RES-ASR-HTK	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

AR SLARS Kidbrooke (SLARS1) - 7 Ml/d

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
South London Artificial Recharge Scheme (SLARS) – Kidbrooke	RES-AR-SLARS1-7	Screened out at Step 1 as compliant
Overall assessment	No risk of deterioration as the scheme does not involve any abstraction from a WFD water body.	

AR Streatham (SLARS2) - 5 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB106039023232 - Thames (Egham to Teddington)

Element Name	Element Reference	Risk of deterioration of WFD status
AR Streatham (SLARS2) - 4 Ml/d	RES-AR-SLARS2	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

AR Merton (SLARS3) - 5 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB106039023232 - Thames (Egham to Teddington)

Element Name	Element Reference	Risk of deterioration of WFD status
AR Merton (SLARS3) - 5 Ml/d	RES-AR-SLARS3	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

ASR South East London (Addington) - 1 Ml/d / ASR South East London (Addington) -3 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB40601G602200 – Epsom North Downs Chalk

GB40601G500500 – Kent Greensand Western

Element Name	Element Reference	Risk of deterioration of WFD status
ASR South East London (Addington) - 3 Ml/d	RES-ASR-SEL	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

ASR Thames Valley/Thames Central - 3 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB106039023232 - Thames (Egham to Teddington)

Element Name	Element Reference	Risk of deterioration of WFD status
ASR Thames Valley/Thames Central - 1 Ml/d	RES-ASR-TV	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There no risk of deterioration to any WFD water bodies.	

Beckton Desalination 150

Option assessed for compliance in the following WFD water bodies:

GB530603911402 – Thames Middle

Element Name	Element Reference	Risk of deterioration of WFD status
Desalination North Beckton to Coppermills 150 Ml/d	NET-DES-BEC-COP	Screened out at Step 1 as compliant

TWRM extension - Coppermills New Header tank	NET-TWRM-COP-HEA	Screened out at Step 1 as compliant
Desalination North Beckton RO Treatment Plant 150 Ml/d	RES-DES-BEC-150	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of failure of WFD objectives in transitional waterbody GB530603911402 – Thames Middle. The option is not expected to cause major impacts on water quality, tidal hydrodynamics or salinity in the Thames Tideway. There may be some localised effects on salinity patterns but there are no WFD higher sensitivity habitats in this water body and major adverse impacts on ecological communities are not expected.	

Beckton Reuse 200 Ml/d (phased 100)

Option assessed for compliance in the following WFD water bodies:

GB106038027950 – Lee Navigation Enfield Lock to Tottenham Locks
GB30641523 - King George V Reservoir
GB106038077852 - Lee (Tottenham Locks to Bow Locks/Three Mills Locks)
GB530603911402 – Thames Middle

Element Name	Element Reference	Risk of deterioration of WFD status
TLT extension from Lockwood to KGV - 800Ml/d	CON-RWS-LCK-KGV-800	Assessed as compliant at Step 2 (see Appendix B)
Reuse Beckton to Lockwood 300 Ml/d	CON-RU-BEC-LCK	Screened out at Step 1 as compliant
KGV Res intake capacity increase	CON-RWS-KGV-360	Assessed as compliant at Step 2 (see Appendix B)
KGV to BPT south of William Girling - 300Ml/d	CON-RWS-KGV-BT-300	Screened out at Step 1 as compliant
Conveyance from Break Tank to Coppermills via Res 5 – (Spine 2)	CON-RWS-BT-COP-800	Screened out at Step 1 as compliant
Reuse Beckton 100 Ml/d (x2)	RES-RU-BEC-100	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of failure of WFD objectives in transitional waterbody GB530603911402 – Thames Middle. The option is not expected to cause major impacts on water quality, tidal hydrodynamics or salinity in the Thames Tideway. There may be some localised effects on salinity patterns but there are no WFD higher sensitivity habitats in this water body and major adverse impacts on ecological communities are not expected.	

Beckton Reuse 300 Ml/d (phased 150)

Option assessed for compliance in the following WFD water bodies:

GB106038027950 – Lee Navigation Enfield Lock to Tottenham Locks
GB30641523 - King George V Reservoir
GB106038077852 - Lee (Tottenham Locks to Bow Locks/Three Mills Locks)
GB530603911402 – Thames Middle

Element Name	Element Reference	Risk of deterioration of WFD status
TLT extension from Lockwood to KGV - 800Ml/d	CON-RWS-LCK-KGV-800	Assessed as compliant at Step 2 (see Appendix B)
Reuse Beckton to Lockwood 300 Ml/d	CON-RU-BEC-LCK	Screened out at Step 1 as compliant
KGV Res intake capacity increase	CON-RWS-KGV-360	Assessed as compliant at Step 2 (see Appendix B)
KGV to BPT south of William Girling - 300Ml/d	CON-RWS-KGV-BT-300	Screened out at Step 1 as compliant
Conveyance from Break Tank to Coppermills via Res 5 – (Spine 2)	CON-RWS-BT-COP-800	Screened out at Step 1 as compliant
Reuse Beckton 150 Ml/d (x2)	RES-RU-BEC-150	Uncertain. Potential deterioration risk from changes in salinity in water body GB530603911402 (Thames Middle) during phase 2 of option. Further understanding of effect required.

Overall assessment	There is a risk of impact on WFD status relating to GB530603911402 Thames Middle when the second phase of the 2 x 150Ml/d option would reduce freshwater inputs below an indicative impact threshold on salinity.

Chalkstream pipelines

Option assessed for compliance in the following WFD water bodies:

GB106038027950 – Lee Navigation Enfield Lock to Tottenham Locks

Element Name	Element Reference	Risk of deterioration of WFD status
New Gauge - River Lee	Tbc	Screened out at Step 1 as compliant
River Wye - Pann Mill	Tbc	Screened out at Step 1 as compliant
River Wandle - Waddon	Tbc	Screened out at Step 1 as compliant
River Cray - North Orpington	Tbc	Screened out at Step 1 as compliant
Overall assessment	No risk of deterioration as the scheme does not involve any net increase in abstraction from a WFD water body.	

Chingford Raw Water Purchase

Option assessed for compliance in the following WFD water bodies:

GB30641659 – William Girling Reservoir

Element Name	Element Reference	Risk of deterioration of WFD status
Chingford Raw Water Purchase	RES-RWP-CHD	Screened out at Step 1 as compliant
Overall assessment	No risk of deterioration as the scheme does not involve any change in abstraction from a WFD water body.	

Coppermills WTW extension 100 Ml/d

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
Coppermills WTW extension 100 Ml/d	WTW-LON-COP-100	Screened out at Step 1 as compliant
TWRM extension - Riverhead Pump Replacement	NET-TWRM-NRV-PUM	Screened out at Step 1 as compliant
Overall assessment	No risk of deterioration as the scheme does not involve any abstraction from a WFD water body.	

Culham to Farmoor 180 Ml/d

Option assessed for compliance in the following WFD water bodies:

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

Element Name	Element Reference	Risk of deterioration of WFD status
Culham to Farmoor	CON-RWS-CUL-FMR-180	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD surface water bodies.	

Deephams Reuse

Option assessed for compliance in the following WFD water bodies:

GB106038027910 - Pymmes and Salmon Brooks
GB106038027950 – Lee Navigation Enfield Lock to Tottenham Locks
GB106038077852 - Lea Tottenham Locks to Bow Locks/Three Mills Locks
GB30641523 - King Georges Reservoir

Element Name	Element Reference	Risk of deterioration of WFD status
Reuse Deephams 46.5 Ml/d	RES-RU-DPH	Assessment of compliant with further work required to confirm conclusions (see Appendix B)
Reuse Deephams to KGV Intake	CON-RU-DPH-KGV	Assessed as compliant at Step 2 (see Appendix B)

Overall assessment	Assessment of WFD compliant but with further work required to confirm level of impact and mitigation measures required. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.

Didcot Raw Water Purchase

Option assessed for compliance in the following WFD water bodies:

GB106039030334 - Thames (Evenlode to Thame)

Element Name	Element Reference	Risk of deterioration of WFD status
Didcot	RES-DRA-DID	Screened out at Step 1 as compliant
Overall assessment	No risk of deterioration as the scheme does not involve any new abstraction from a WFD water body.	

Groundwater Addington 1 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB40601G602200 - Epsom North Downs Chalk

Element Name	Element Reference	Risk of deterioration of WFD status
GW_Groundwater Addington	RES-GW-ADD	Screened out at Step 1 as compliant
Overall assessment	Based on the available information there is no risk of deterioration in WFD status or adverse effect on water body objectives in any water bodies.	

Groundwater Dapdune

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
Groundwater Dapdune Licence Disaggregation - 2.2 Ml/d	RES-GW-DAP	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

Groundwater Datchet 6 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB106039023231- Thames (Cookham to Egham)

Element Name	Element Reference	Risk of deterioration of WFD status
GW_groundwater Datchet – 5.7 Ml/d	RES-GW-DAT	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	No risk of deterioration as the scheme involves a confined (non-WFD) chalk aquifer and poses a negligible risk to any WFD surface water bodies.	

Groundwater London confined chalk (north) 2 Ml/d

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
GW_groundwater London confined chalk (north) - 2 Ml/d	RES-GW-LCC	Screened out at Step 1 as compliant
Overall assessment	No risk of deterioration as the scheme involves a confined (non-WFD) chalk aquifer and does not impact any other WFD surface water bodies.	

Groundwater Moulsford 1 – 3.5 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB40601G601000 - Vale of White Horse Chalk

GB106039030331 - Thames Wallingford to Caversham

Element Name	Element Reference	Risk of deterioration of WFD status
GW_Groundwater Moulsford	RES-GW-MOU	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is a potential risk that abstraction from the groundwater water body GB40601G601000 – Vale of White Horse Chalk will result in a WFD deterioration to the dependent surface water body GB106039030331 - Thames Wallingford to Caversham. However, the abstraction rate is low in the	

	context of flow in the river and that most of the abstracted flow would be returned upstream via sewage works.

Groundwater Southfleet/Greenhithe (disaggregation)

Option assessed for compliance in the following WFD water bodies:

GB40601G501800 - West Kent Darent and Cray Chalk
GB40601G500300 - North Kent Medway Chalk

Element Name	Element Reference	Risk of deterioration of WFD status
GW_Groundwater_Southfleet/Greenhithe (Disaggregation)	RES-GW-SOU	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	Based on the available information there is deemed to be no risk of deterioration in WFD status or adverse effect on water body objectives in any water bodies.	

Honor Oak

Option assessed for compliance in the following WFD water bodies:

GB106039023270 - Ravensbourne (Catford to Deptford)

Element Name	Element Reference	Risk of deterioration of WFD status
Groundwater Honor Oak – 2.8 Ml/d	RES-GW-HON	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

ITZ_North SWX to SWA 72

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
South East Strategic Reservoir Option treated water transfer to SWA	NET-IZT-AB-LC-72	Screened out at Step 1 as compliant
South East Strategic Reservoir Option - SWA WTW (24Ml/d)	WTW-SWOX-ABI-SWA	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD surface water bodies.	

ITZ_North SWX to SWA 48

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
South East Strategic Reservoir Option treated water transfer to SWA	NET-IZT-AB-LC-48	Screened out at Step 1 as compliant
South East Strategic Reservoir Option - SWA WTW (24Ml/d)	WTW-SWOX-ABI-SWA	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD surface water bodies.	

Kempton WTW new 100 Ml/d

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
Kempton WTW new 100 Ml/d	WTW-LON-KEM-100	Screened out at Step 1 as compliant
New Shaft at Kempton	NET-TWRM-KEM	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

Medmenham intake to SWA

Option assessed for compliance in the following WFD water bodies:

GB106039023233 - Thames (Reading to Cookham)

Element Name	Element Reference	Risk of deterioration of WFD status
SWA south: Medmenham Raw water intake and transfer	CON-RWS-SWA-MMM	Assessed as compliant at Step 2 (see Appendix B)

SWA south Medmenham WTW (24Ml/d treated water PS transfer and SR)	WTW-SWA-MMM	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration or adverse effect on water body status or objectives in GB106039023233 - Thames (Reading to Cookham) as a result of the scheme. There may be a local impact on flow regime, in particular affecting extreme low flows which may be reduced by 10%, but this is not expected to affect wider WFD status for the biological elements concerned.	

Merton recommissioning

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
GW_Merton recommissioning	RES-RC-MTN	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration or adverse effect on water body status or objectives as the scheme involves a confined (non-WFD) chalk aquifer and does not impact WFD surface water bodies and will operate within existing licence limits.	

New River Head - Removal of Constraints

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
New River Head - Removal of Constraints – 3.45 Ml/d	RES-RC-NRV	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD surface water bodies.	

NTC_Dapdune

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
RC Dapdune - removal of constraints to DO - 3.2 Ml/d	RES-RC-DAP	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

NTC_Ladymead (+ Shalford to Albury transfer main)

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
Ladymead WTW - removal of constraints to DO - 7.8 Ml/d	RES-RC-LAD	Screened out at Step 1 as compliant
Shalford to Netley Mill	NET-GUI-SFD-NML	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

Oxford Canal to Cropredy Resource 15 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB40402G992400 -Tame Anker Mease – Coal Measures Black Country
GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield
GB104028046930 - Tame (W/ton Arm) source to conf Oldbury
GB104028046842 - Tame – conf two arms to R Rea
GB106039037310 - Cherwell (Cropredy to Nell Bridge)
GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)
GB106039037432 - Cherwell (Bletchingdon to Ray)

Element Name	Element Reference	Risk of deterioration of WFD status
Oxford Canal Transfer to Cropredy 15Ml/d	RES-RWTS-OXC-CRP-15	Assessment of compliant but with further work required to confirm conclusions (see Appendix B)
Overall assessment	Assessment of WFD compliant but with further work required to confirm level of impact and mitigation measures. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.	

RC Ashton Keynes borehole pumps 2.5 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB40601G60040 - Burford Jurassic
GB106039029750 - Churn (Baunton to Cricklade)

Element Name	Element Reference	Risk of deterioration of WFD status
RC Ashton Keynes borehole pumps - 2.5 Ml/d	RES-RC-ASH	Uncertain. Potential risk of deterioration to river water body (River Churn (GB106039029750)) linked to likely groundwater drawdown of GB40601G600400 (Burford Jurassic). The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7.
Overall assessment	Currently uncertain pending further evidence. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.	

RC Britwell 1.31 Ml/d

Option assessed for compliance in the following WFD water bodies:

GB40601G601000 - Vale of White Horse Chalk
GB106039023740 - Chalgrove Brook

Element Name	Element Reference	Risk of deterioration of WFD status
Britwell - Removal of Constraints	RES-RC-BTW	Uncertain. Potential risk of deterioration to river water body (Chalgrove Brook (GB106039023740)) linked abstraction from Vale of White Horse Chalk (GB40601G601000) – further investigation and mitigation needed.
Overall assessment	Currently uncertain pending further evidence. With further assessment and development of appropriate mitigation measures, the option may be WFD compliant but delivery of the appropriate mitigation measures may be challenging.	

RC Epsom borehole pumps 2.13Ml/d (groundwater scheme)

Option assessed for compliance in the following WFD water bodies:

GB40602G602300 - Bromley Tertiaries
GB106039017440 – Hogsmill River

Element Name	Element Reference	Risk of deterioration of WFD status
Epsom - Removal of Constraints	RES-RC-EPS	Uncertain. Potential risk of deterioration to river water body (Hogsmill River (GB106039017440)) linked to abstraction impacting GB40602G602300 (Bromley Tertiaries). The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. Currently a 3rd party flow augmentation scheme is in operation. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through implementation of appropriate mitigation measures following options appraisal. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency.
Overall assessment	Currently uncertain pending further evidence. With further assessment and development of appropriate mitigation measures, such as extension of the existing river flow augmentation scheme, the option is considered likely to be WFD compliant.	

Severn-Thames Transfer

Option assessed for compliance in the following WFD water bodies:

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
GB104028046841 - Tame - R Rea to R Blythe
GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford
GB109054044404 - Severn - conf R Avon to conf Upper Parting
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)

Element Name	Element Reference	Risk of deterioration of WFD status
CON_Deerhurst to Culham 300 Ml/d (Lon only)	CON-RWT-DEH-CLM-300	Assessed as compliant at Step 2 (see Appendix B)
Transfer of Minworth Effluent 115 Ml/d	RES-RWTS-MIN	Currently uncertain pending further water quality evidence to enable more detailed assessment of water quality compliance, and linked ecological quality compliance, particularly under low flow conditions in the River Avon downstream of Warwick. With further assessment and development of appropriate mitigation measures, such as additional tertiary treatment, the option is considered likely to be WFD compliant.
Raw Water Transfer Mythe 15 Ml/d (Lon only)	RES-RWTS-MYT	Screened out at Step 1 as compliant
Netheridge Final Effluent Transfer	RES-RWTS-NTH	Assessed as compliant at Step 2 (see Appendix B)
Vyrnwy Transfer to Severn Trent Water 30Ml/d	RWP_STT UU/ST OPT B	Assessed as compliant at Step 2 (see Appendix B)
Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 60 Ml/d	RES-RWTS-VYR-60	Provisional assessment of compliant with further work required to confirm level of impact and mitigation measures
Overall assessment	Currently uncertain pending further evidence on the Minworth effluent transfer support element and its potential water quality effects on the River Avon locally downstream of Warwick. Further work is also required to confirm level of impact and mitigation measures specifically associated with effects on the Afon Vyrnwy and River Wye both of which are considered as provisionally compliant and this should be secured with appropriate mitigation measures.	

Severn-Thames Transfer 1

Option assessed for compliance in the following WFD water bodies:

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
GB109054044404 - Severn - conf R Avon to conf Upper Parting
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)

Element Name	Element Reference	Risk of deterioration of WFD status
CON_Deerhurst to Culham 300 Ml/d (Lon only)	CON-RWT-DEH-CLM-300	Assessed as compliant at Step 2 (see Appendix B)
Raw Water Transfer Mythe 15 Ml/d (Lon only)	RES-RWTS-MYT	Screened out at Step 1 as compliant
Netheridge Final Effluent Transfer	RES-RWTS-NTH	Assessed as compliant at Step 2 (see Appendix B)
Vyrnwy Transfer to Severn Trent Water 30Ml/d	RWP_STT UU/ST OPT B	Assessed as compliant at Step 2 (see Appendix B)
Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 60 Ml/d	RES-RWTS-VYR-60	Provisional assessment of compliant, with further work required to confirm level of impact and the mitigation measures required (which may include discharge direct to River Severn to secure WFD compliance).
Overall assessment	Provisional assessment of WFD compliant with further work required to confirm level of impact and mitigation measures specifically associated with effects on the Afon Vyrnwy (this may include discharge direct to River Severn to secure WFD compliance). With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.	

Severn-Thames Transfer 2

Option assessed for compliance in the following WFD water bodies:

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
GB104028046841 - Tame - R Rea to R Blythe
GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford
GB109054044404 - Severn - conf R Avon to conf Upper Parting
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)

Element Name	Element Reference	Risk of deterioration of WFD status
CON_Deerhurst to Culham 300 Ml/d (Lon only)	CON-RWT-DEH-CLM-300	Assessed as compliant at Step 2 (see Appendix B)
Transfer of Minworth Effluent 115 Ml/d	RES-RWTS-MIN	Currently uncertain pending further water quality evidence to enable more detailed assessment of water quality compliance, and linked ecological quality compliance, particularly under low flow conditions in the River Avon downstream of Warwick. With further assessment and development of appropriate mitigation measures, such as additional tertiary treatment, the option is considered likely to be WFD compliant.
Raw Water Transfer Mythe 15 Ml/d (Lon only)	RES-RWTS-MYT	Screened out at Step 1 as compliant
Netheridge Final Effluent Transfer	RES-RWTS-NTH	Assessed as compliant at Step 2 (see Appendix B)
Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 60 Ml/d	RES-RWTS-VYR-60	Provisional assessment of compliant, with further work required to confirm level of impact and the mitigation measures required (which may include discharge direct to River Severn to secure WFD compliance).
Overall assessment	Currently uncertain pending further evidence on the Minworth effluent transfer support element and its potential water quality effects on the River Avon locally downstream of Warwick. Further work is also required to confirm level of impact and mitigation measures specifically associated with effects on the Afon Vyrnwy, considered as provisionally compliant (and compliance can be secured if necessary by discharging direct to the River Severn).	

Severn-Thames Transfer 3

Option assessed for compliance in the following WFD water bodies:

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
GB109055037112 - Wye - Hampton Bishop to conf Kerne Br
GB109055037111 - Wye - conf Walford Bk to Bigsweir Br
GB109054049142 - Severn - conf Bele Bk to conf Sundorne Bk
GB104028046841 - Tame - R Rea to R Blythe
GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford
GB109054044404 - Severn - conf R Avon to conf Upper Parting
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)

Element Name	Element Reference	Risk of deterioration of WFD status
Raw Water Transfer Deerhurst to Culham 400 Ml/d	CON-RWT-DEH-CLM-400	Assessed as compliant at Step 2 (see Appendix B)
Transfer of Minworth Effluent 115 Ml/d	RES-RWTS-MIN	Currently uncertain pending further water quality evidence to enable more detailed assessment of water quality compliance, and linked ecological quality compliance, particularly under low flow conditions in the River Avon downstream of Warwick. With further assessment and development of appropriate mitigation measures, such as additional tertiary treatment, the option is considered likely to be WFD compliant.
Raw Water Transfer Mythe 15 Ml/d (Lon only)	RES-RWTS-MYT	Screened out at Step 1 as compliant
Netheridge Final Effluent Transfer	RES-RWTS-NTH	Assessed as compliant at Step 2 (see Appendix B)
Vyrnwy Transfer to Severn Trent Water 30Ml/d	RWP_STT UU/ST OPT B	Assessed as compliant at Step 2 (see Appendix B)
Raw Water Transfer: Upper Severn - Vyrnwy Reservoir 60 Ml/d	RES-RWTS-VYR-60	Provisional assessment of compliant, with further work required to confirm level of impact and the mitigation measures required (which may include discharge direct to River Severn to secure WFD compliance).
River Wye to Deerhurst 60 Ml/d	RES-RWTS-WYE-60.3	Provisional assessment of compliant with further work required to confirm level of impact and mitigation measures
Overall assessment	Currently uncertain pending further evidence on the Minworth effluent transfer support element and its potential water quality effects on the River Avon locally downstream of Warwick. Further work is also required to confirm level of impact and mitigation measures specifically associated with effects on the Afon Vyrnwy and River Wye both of which are considered as provisionally compliant and WFD compliance can be secured with appropriate mitigation measures in place.	

South East Strategic Reservoir Option 125Mm^3

Option assessed for compliance in the following WFD water bodies:

GB106039023360 - Cow Common Brook and Portobello Ditch
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)

Element Name	Element Reference	Risk of deterioration of WFD status
New Reservoir South East Strategic Reservoir Option 125Mm^3	RES-RRR-ABI-125Mm^3	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD surface water bodies.	

South East Strategic Reservoir Option 150Mm^3

Option assessed for compliance in the following WFD water bodies:

GB106039023360 - Cow Common Brook and Portobello Ditch
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)

Element Name	Element Reference	Risk of deterioration of WFD status
New Reservoir South East Strategic Reservoir Option 150Mm^3	RES-RRR-ABI-150Mm^3	Assessed as compliant at Step 2 (see Appendix B)
Overall assessment	There is no risk of deterioration to any WFD surface water bodies.	

Wessex to SWOX (Flaxlands)

Option does not include any WFD water bodies

Element Name	Element Reference	Risk of deterioration of WFD status
Inter-Company Transfer - Wessex to SWOX 2.9 Ml/d (Flaxlands)	RES-ICT-WSX-FLX	Screened out at Step 1 as compliant
Overall assessment	There is no risk of deterioration to any WFD water bodies.	

APPENDIX D:
WFD COMPLIANCE ASSESSMENT OUTCOMES FOR EACH OF THE SET OF "REASONABLE ALTERNATIVE" PROGRAMMES (STEP 4)

This section presents the outcomes of the WFD compliance assessment for each of the set of WRMP19 "reasonable alternative" programmes as well as the preferred programme. As the assessment is at the programme level it is a cumulative assessment of all options within that programme.

Preferred programme

Table D.1 sets out the options included in the preferred programme of the WRMP19 and the WFD water bodies they have been assessed for. Where there are multiple options potentially impacting on the same water body, these water bodies are reviewed below.

In addition, it is re-stated (from Section 4) that the Vyrnwy flow support element of a Severn-Thames Transfer requires the collection and consideration of further evidence prior to confirming WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir. These are GB109054049880 - Vrynwy - Lake Vrynwy to conf Afon Cownwy; GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy; and GB109054049852 - Afon Vyrnwy DS of Banwy confluence. If necessary, compliance for the Vyrnwy flow support option can be secured by direct discharge to the River Severn rather than to the Afon Vyrnwy.

Following discussion with the Environment Agency in response to its representation on the revised draft WRMP19, further supporting environmental investigations will be undertaken to confirm the assessment of WFD compliance of the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option. For the Deephams Reuse option, the scope of further investigation relates to the potential changes in flow and water quality pressures on aquatic ecology in the lower freshwater River Lee (GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks) and any effects of reduced pass-forward flow to the tidal system (GB530603911402 - Thames Middle). For the Oxford Canal Transfer to Cropredy option the scope of further investigation relates to the potential changes in groundwater abstraction from the Birmingham aquifers (GB40402G992400 -Tame Anker Mease – Coal Measures Black Country, and GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield) and their linked surface waters at the abstraction points (GB104028046930 - Tame (W/ton Arm) source to conf Oldbury, and GB104028046842 - Tame – conf two arms to R Rea respectively). The scope also includes improving the baseline evidence base for flow, water quality and aquatic ecology and the understanding of impacts in the River Cherwell, particularly in the most upstream water body that would receive the transferred water (GB106039037310 - Cherwell (Cropredy to Nell Bridge)). Where necessary, additional mitigation measures will be considered as part of these further investigations. The scope of these further environmental investigations is set out in Section 11 of the WRMP19.

GB106039030334 - Thames (Evenlode to Thame)

Locally at Culham, Thames Water would manage in-combination abstractions for the South East Strategic Reservoir Option (from 2037), the Culham to Farmoor transfer (from 2037), regulating releases from the South East Strategic Reservoir Option (from 2037) and the supported Severn-Thames Transfer (from 2083). Supporting evidence has identified that the continuous nature of these discharges during low flow periods presents fewer risks to fish and aquatic invertebrates, albeit the cumulative magnitude of the flow increase would be to the indicative threshold identified. The Culham to Farmoor transfer and the abstraction for the South East Strategic Reservoir Option would operate within licence conditions including hands-off flow conditions to protect low river flows and limit daily maximum abstraction rate. Combined operation would therefore modulate the flow regime of the River Thames, with reduced high flows or enhanced low flows regularly and for long periods. A combined

operating strategy would be developed with regulators and other stakeholders to manage these effects in terms of the potential ecological impacts on the River Thames locally and downstream. A modulated flow regime would be most apparent until the next significant tributary, the River Thame, although modulation of the flow regime of downstream waterbodies cannot be ruled out at this stage.

The in-combination effect with cessation of abstraction from the River Thames at Farmoor at low flow conditions to improve flows in the Oxford Watercourses (by re-locating the abstraction at low flows to the new Culham intake) would also need considering, noting that these would be flow-neutral in the River Thames downstream of Culham. The Oxford Canal Transfer supplementing flow in the River Thames upstream of Culham would not represent a significant cumulative effect due to its low magnitude of flow change. Further downstream in the water body, the Didcot Raw Water Purchase option (from 2020) would not represent a change in river flow.

Subject to development of the detailed appropriate operating strategy for the Culham-related options, the combined effect on the River Thames at Culham and downstream is assessed as WFD compliant.

GB106039017440 - Hogsmill

As set out in Appendix B, the Epsom groundwater (removal of constraints) element has the potential to baseflow in the Hogsmill River. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. A 3rd party flow augmentation is currently operated on a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through appropriate mitigation measures, if adverse impacts are identified in the investigation. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of adverse effects requires further investigation and is currently assessed as having a degree of uncertainty, prior to the completion of the planned investigation, and if necessary, inclusion of additional mitigation. The mitigation could include extension of the existing river flow augmentation scheme and/or additional abstraction licence controls. With any required mitigation measures in place, WFD compliance can be secured.

Table D.1 Summary of in-combination WFD compliance assessment of the Preferred Programme

			WFD water body																										
Type	**ID and name**	**River Basin District**	Aquifer Storage and Recovery (ASR) Horton	AR SLARS Kidbrooke (SLARS1) 7 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 3 Ml/d	Chalkstream pipelines	Chingford Raw Water Purchase	Coppermills WTW extension	Culham to Farmoor 180 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Dapdune	Groundwater Datchet 6Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8	Kempton WTW new 100 Ml/d	Medmenham intake to SWA	Merton Recommissioning	New River Head - Removal of Constraints	NTC_Dapdune	NTC_Ladymead (+ Shalford to Albury transfer	Oxford Canal to Cropredy Resource 15 Ml/d	RC Epsom borehole pumps - 2.13 Ml/d	Severn-Thames Transfer 1	South East Strategic Reservoir Option 150Mm^3
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames																					✓			
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames																					✓			
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames																					✓			
	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames																								✓
	GB106039030334 - Thames (Evenlode to Thame)	Thames								✓		✓													✓	✓
	GB106039030331 - Thames (Wallingford to Caversham)	Thames								✓															✓	✓
	GB106039023233 - Thames (Reading to Cookham)	Thames								✓								✓							✓	✓
	GB106039023231 – Thames (Cookham to Egham)	Thames								✓					✓										✓	✓
	GB106039023232 – Thames (Egham to Teddington)	Thames			✓					✓															✓	✓
	GB106039017440 - Hogsmill	Thames																						?		
	GB106039017630 - Wey (Shalford to R Thames confluence at Weybridge)	Thames												✓												
	GB106038027910 – Pymmes and Salmon Brooks – Deephams STW to Tottenham Locks	Thames									✓															
	GB106038027950 – Lea Navigation Enfield Lock to Tottenham Locks	Thames					✓				✓															
	GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks	Thames									✓															
	GB109054049880 - Vrynwy - Lake Vrynwy to conf Afon Cownwy	Severn																							✓	
	GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy	Severn																							✓	
	GB109054049852 - Afon Vyrnwy DS of Banwy confluence	Severn																							✓	
	GB109054049800 - Afon Vyrnwy - conf Afon Tanat to conf R Severn	Severn																							✓	
	GB109054044404 - Severn - conf R Avon to conf Upper Parting	Severn																							✓	
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber																					✓			
	GB104028046842 - Tame – conf two arms to R Rea	Humber																					✓			
Lake	GB30641523 – King Georges Reservoir	Thames									✓															
	GB30641659 – William Girling Reservoir	Thames						✓																		
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames				✓							✓													
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	✓													✓										
	GB40601G500300 - North Kent Medway Chalk	Thames														✓										
	GB40601G601000 - Vale of White Horse Chalk	Thames																								
	GB40601G500500 – Kent Greensand Western	Thames				✓																				
	GB40602G602300 - Bromley Tertiaries	Thames																						✓		
	GB40402G992400 -Tame Anker Mease – Coal Measures Black Country	Humber																					✓			
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber																					✓			

Key: All WFD water bodies identified in Thames Water preferred programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant; ? uncertain
Grey indicates no programme level in-combination effect considered likely. Blue indicates potential for programme level alone or in-combination effects, reviewed above.

Least Cost programme (Phased_LC)

Table D.2 sets out the options included in the Least Cost programme and the WFD water bodies they have been assessed for. Where there is potential for programme level alone or in-combination effects these are reviewed below.

In addition, for the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option, further supporting environmental investigations are required by the Environment Agency to confirm the assessment of WFD compliance.

GB106039029750 - Churn (Baunton to Cricklade)

As set out in Appendix B, the Ashton Keynes groundwater (removal of constraints) element could influence the River Churn river water body and further evidence is required to confirm the extent of hydraulic connectivity. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. The WFD compliance assessment for this water body currently has uncertainty pending this further evidence. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.

GB106039023740 - Chalgrove Brook

As set out in Appendix B, the Britwell groundwater (removal of constraints) element could influence the Chalgrove Brook river water body. Further evidence is required to confirm the extent of hydraulic connectivity and any impacts on the aquatic ecology. The WFD compliance assessment for this water body currently has uncertainty pending further evidence. With further assessment and development of appropriate mitigation measures, the option may be WFD compliant but delivery of the appropriate mitigation measures could be challenging.

GB106039017440 - Hogsmill

As set out in Appendix B, the Epsom groundwater (removal of constraints) element has the potential to baseflow in the Hogsmill River. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. A 3rd party flow augmentation is currently operated on a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through appropriate mitigation measures, if adverse impacts are identified in the investigation. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of adverse effects requires further investigation and is currently assessed as having a degree of uncertainty, prior to the completion of the planned investigation, and if necessary, inclusion of additional mitigation. The mitigation could include extension of the existing river flow augmentation scheme and/or additional abstraction licence controls. With any required mitigation measures in place, WFD compliance can be secured.

Table D.2 Summary of in-combination WFD compliance assessment of the least cost programme

WFD water body			Option																												
Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Medmenham intake to SWA	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	South East Strategic Reservoir Option 125Mm^3	Wessex to SWOX (Flaxlands)
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames																					✓								
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames																					✓								
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames																					✓								
	GB106039029750 - Churn (Baunton to Cricklade)	Thames																						?							
	GB106039023740 - Chalgrove Brook	Thames																							?						
	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames																										✓			
	GB106039030334 - Thames (Evenlode to Thame)	Thames										✓																✓			
	GB106039030331 - Thames (Wallingford to Caversham)	Thames														✓												✓			
	GB106039023233 - Thames (Reading to Cookham)	Thames																✓										✓			
	GB106039023231 – Thames (Cookham to Egham)	Thames												✓														✓			
	GB106039023232 – Thames (Egham to Teddington)	Thames		✓	✓		✓																					✓			
	GB106039017440 - Hogsmill	Thames																								?					
	GB106038027910 – Pymmes and Salmon Brooks – Deephams STW to Tottenham Locks	Thames									✓																				
	GB106038027950 – Lea Navigation Enfield Lock to Tottenham Locks	Thames									✓																				
	GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks	Thames									✓																				
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber																					✓								
	GB104028046842 - Tame – conf two arms to R Rea	Humber																					✓								
TRAC	GB530603911402 Thames Middle	Thames						✓																							
Lake	GB30641523 – King Georges Reservoir	Thames									✓																				
	GB30641659 – William Girling Reservoir	Thames							✓																						
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames				✓							✓																		
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	✓														✓														
	GB40601G500300 - North Kent Medway Chalk	Thames															✓														
	GB40601G601000 - Vale of White Horse Chalk	Thames														✓									✓						
	GB40601G500500 – Kent Greensand Western	Thames				✓																									
	GB40602G602300 - Bromley Tertiaries	Thames																								✓					
	GB40601G60040 - Burford Jurassic	Thames																						✓							

Table D.2 cont.

WFD water body			Option																										
Type	**ID and name**	**River Basin District**	Aquifer Storage and Recovery (ASR) Horton Kirby	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Medmenham intake to SWA	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	South East Strategic Reservoir Option 125Mm^3	Wessex to SWOX (Flaxlands)
Ground water	GB40402G992400 -Tame Anker Mease – Coal Measures Black Country	Humber																				✓							
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber																				✓							

Key: All WFD water bodies identified in programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant; ? uncertain
Grey highlight indicates no programme level in-combination effect considered likely.
Blue highlight indicates potential for programme level alone or in-combination effects, reviewed above.

Multi-obj_RES programme

Table D.3 sets out the options included in the Multi-obj_RES programme and the WFD water bodies they have been assessed for. Where there is potential for programme level alone or in-combination effects these are reviewed below.

In addition, it is re-stated that the Vyrnwy support element of a Severn-Thames Transfer requires the collection and consideration of further evidence prior to confirming WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir. These are GB109054049880 - Vrynwy - Lake Vrynwy to conf Afon Cownwy; GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy; and GB109054049852 - Afon Vyrnwy DS of Banwy confluence. If necessary, compliance for the Vyrnwy flow support option can be secured by direct discharge to the River Severn rather than to the Afon Vyrnwy.

This programme includes the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

GB106039029750 - Churn (Baunton to Cricklade)

As set out in Appendix B, the Ashton Keynes groundwater (removal of constraints) element could influence the River Churn river water body and further evidence is required to confirm the extent of hydraulic connectivity. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. The WFD compliance assessment for this water body currently has uncertainty pending this further evidence. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.

GB106039023740 - Chalgrove Brook

As set out in Appendix B, the Britwell groundwater (removal of constraints) element could influence the Chalgrove Brook river water body. Further evidence is required to confirm the extent of hydraulic connectivity and any impacts on the aquatic ecology. The WFD compliance assessment for this water body currently has uncertainty pending further evidence. With further assessment and development of appropriate mitigation measures, the option may be WFD compliant but delivery of the appropriate mitigation measures could be challenging.

GB106039017440 - Hogsmill

As set out in Appendix B, the Epsom groundwater (removal of constraints) element has the potential to baseflow in the Hogsmill River. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. A 3rd party flow augmentation is currently operated on a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through appropriate mitigation measures, if adverse impacts are identified in the investigation. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of adverse effects requires further investigation and is currently assessed as having a degree of uncertainty, prior to the completion of the planned investigation, and if necessary, inclusion of additional mitigation. The mitigation could include extension of the existing river flow augmentation scheme and/or additional abstraction licence controls. With any required mitigation measures in place, WFD compliance can be secured.

GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford

As set out in Appendix B, the Minworth effluent transfer element of a support Severn-Thames Transfer option requires further consideration of the effect on sanitary, nutrient and chemical water quality, as well as water temperature and consequently aquatic ecology of mixing tertiary treated effluent into the River Avon downstream of Warwick, particularly under low river flow conditions in the River Avon. At

present WFD compliance in this water body is considered as uncertain, subject to further investigation and the potential need for additional mitigation which may be challenging to achieve WFD compliance.

Table D.3 Summary of in-combination WFD compliance assessment of the Multi-obj_RES programme

WFD water body			Option																													
Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR SLARS Kidbrooke (SLARS1) 7 Ml/d	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Reuse 200 Ml/d (phased 100)	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Henley to SWA 5 Ml/d	Honor Oak	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	Severn-Thames Transfer 2	South East Strategic Reservoir Option 150Mm³	Wessex to SWOX (Flaxlands)	ITZ_North SWX to SWA 72 option
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames																				✓										
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames																				✓										
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames																				✓										
	GB106039029750 - Churn (Baunton to Cricklade)	Thames																					?									
	GB106039023740 - Chalgrove Brook	Thames																						?								
	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames																										✓				
	GB106039030334 - Thames (Evenlode to Thame)	Thames										✓															✓	✓				
	GB106039030331 - Thames (Wallingford to Caversham)	Thames													✓												✓	✓				
	GB106039023233 - Thames (Reading to Cookham)	Thames																									✓	✓				
	GB106039023231 – Thames (Cookham to Egham)	Thames												✓													✓	✓				
	GB106039023232 – Thames (Egham to Teddington)	Thames			✓	✓		✓																			✓	✓				
	GB106039017440 - Hogsmill	Thames																							?							
	GB106038027950 – Lee Navigation Enfield Lock to Tottenham Locks	Thames							✓																							
	GB106038077852 - Lee (Tottenham Locks to Bow Locks/Three Mills Locks)	Thames							✓																							
	GB106039023270 - Ravensbourne (Catford to Deptford)	Thames																✓														
	GB109054049880 - Vrynwy - Lake Vrynwy to conf Afon Cownwy	Severn																									✓					
	GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy	Severn																									✓					
	GB109054049852 - Afon Vyrnwy DS of Banwy confluence	Severn																									✓					
	GB109054049800 - Afon Vyrnwy - conf Afon Tanat to conf R Severn	Severn																									✓					

Table D.3 cont.

Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR SLARS Kidbrooke (SLARS1) 7 Ml/d	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Reuse 200 Ml/d (phased 100)	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Henley to SWA 5 Ml/d	Honor Oak	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	Severn-Thames Transfer 2	South East Strategic Reservoir Option 150Mm^3	Wessex to SWOX (Flaxlands)	ITZ_North SWX to SWA 72 option
River	GB104028046841 - Tame - R Rea to R Blythe	Trent																								✓			
	GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford	Severn																								?			
	GB109054044404 - Severn - conf R Avon to conf Upper Parting	Severn																								✓			
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber																				✓							
	GB104028046842 - Tame – conf two arms to R Rea	Humber																				✓							
TRAC	GB530603911402 Thames Middle	Thames							✓																				
Lake	GB30641523 – King Georges Reservoir	Thames							✓																				
	GB30641659 – William Girling Reservoir	Thames								✓																			
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames					✓						✓																
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	✓													✓													
	GB40601G500300 - North Kent Medway Chalk	Thames														✓													
	GB40601G601000 - Vale of White Horse Chalk	Thames													✓									✓					
	GB40601G500500 – Kent Greensand Western	Thames					✓																						
	GB40602G602300 - Bromley Tertiaries	Thames																							✓				
	GB40601G60040 - Burford Jurassic	Thames																					✓						
	GB40601G602600 - Maidenhead chalk	Thames															✓												
	GB40402G992400 -Tame Anker Mease – Coal Measures Black Country	Humber																				✓							
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber																				✓							

Key: All WFD water bodies identified in programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant; ? uncertain
Grey highlight indicates no programme level in-combination effect considered likely.
Blue highlight indicates potential for programme level alone or in-combination effects, reviewed above.

Multi-obj_FP programme

Table D.4 sets out the options included in the Multi-obj_FP programme and the WFD water bodies they have been assessed for. Where there is potential for programme level alone, or in-combination effects these are reviewed below.

In addition, it is re-stated that the Vyrnwy and Wye support elements of a Severn-Thames Transfer require the collection and consideration of further evidence prior to confirming WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir and locally in the River Wye. These are 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; and in the River Wye GB109055037112 - Wye - Hampton Bishop to conf Kerne Br and GB109055037111 - Wye - conf Walford Bk to Bigsweir Br.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

GB106039029750 - Churn (Baunton to Cricklade)

As set out in Appendix B, the Ashton Keynes groundwater (removal of constraints) element could influence the River Churn river water body and further evidence is required to confirm the extent of hydraulic connectivity. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. The WFD compliance assessment for this water body currently has uncertainty pending this further evidence. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.

GB106039023740 - Chalgrove Brook

As set out in Appendix B, the Britwell groundwater (removal of constraints) element could influence the Chalgrove Brook river water body. Further evidence is required to confirm the extent of hydraulic connectivity and any impacts on the aquatic ecology. The WFD compliance assessment for this water body currently has uncertainty pending further evidence. With further assessment and development of appropriate mitigation measures, the option may be WFD compliant but delivery of the appropriate mitigation measures could be challenging.

GB106039017440 - Hogsmill

As set out in Appendix B, the Epsom groundwater (removal of constraints) element has the potential to baseflow in the Hogsmill River. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. A 3rd party flow augmentation is currently operated on a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through appropriate mitigation measures, if adverse impacts are identified in the investigation. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of adverse effects requires further investigation and is currently assessed as having a degree of uncertainty, prior to the completion of the planned investigation, and if necessary, inclusion of additional mitigation. The mitigation could include extension of the existing river flow augmentation scheme and/or additional abstraction licence controls. With any required mitigation measures in place, WFD compliance can be secured.

GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford

As set out in Appendix B, the Minworth effluent transfer element of a support Severn-Thames Transfer option requires further consideration of the effect on sanitary, nutrient and chemical water quality, as well as water temperature and consequently aquatic ecology of mixing tertiary treated effluent into the

River Avon downstream of Warwick, particularly under low river flow conditions in the River Avon. At present WFD compliance in this water body is considered as uncertain, subject to further investigation and the potential need for additional mitigation which may be challenging to achieve WFD compliance.

GB530603911402 Thames Middle

Table D.4 indicates the potential for programme level in-combination effects between the Beckton Reuse (300 Ml/d) option and the Beckton Desalination (150 Ml/d) option. These options directly influence freshwater flow into the middle Thames Tideway, with the Beckton Desalination (150 Ml/d) option programmed first (2065) followed by the Beckton Reuse option (2085). The cumulative effect of these two options is a reduction in freshwater flows to the middle Tideway of around 450Ml/d is greater than the indicative impact threshold on salinity of 275-365 Ml/d. Further reductions in freshwater input at this sensitive location for salinity ingress to the middle Thames Tideway could have inherent effects on water quality and supported (saline-sensitive) ecology. The threshold is indicative only and requires further study and analysis to confirm its validity. It is considered that this scale of freshwater reduction could lead to salinity regime changes in the middle Tideway and the Multi-obj_FP programme may not comply with WFD objectives for the ecology of the transitional water body.

Further baseline understanding of the salinity regime of the middle Tideway is required to better understand these patterns, noting that there are no continuous measurements of salinity (by the Environment Agency or others) seawards of Battersea. Further primary understanding of the sensitivity of the infauna communities present to the salinity changes anticipated would also be required. Should there be an actual threshold volume of freshwater required, of the scale currently identified to maintain the salinity profile in the middle Tideway (in respect of WFD compliance of ecology), there are currently no obvious mitigation measures. Salinity effects cannot be directly mitigated and constraining or ceasing operation at a salinity trigger would not reverse the effect, with only a return to high river flows (several thousand Ml/d) over-riding the summer saline ingress pattern.

Table D.4 Summary of in-combination WFD compliance assessment of the Multi-obj_FP programme

WFD water body			Option																														
Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR SLARS Kidbrooke (SLARS1) 7 Ml/d	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Beckton Reuse 300 Ml/d (phased 150)	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	ITZ_North SWX to SWA 48	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	Severn-Thames Transfer 3	South East Strategic Reservoir Option 125Mm^3
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames																							✓								
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames																							✓								
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames																							✓								
	GB106039029750 - Churn (Baunton to Cricklade)	Thames																								?							
	GB106039023740 - Chalgrove Brook	Thames																									?						
	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames																															✓
	GB106039030334 - Thames (Evenlode to Thame)	Thames												✓																		✓	✓
	GB106039030331 - Thames (Wallingford to Caversham)	Thames																✓														✓	✓
	GB106039023233 - Thames (Reading to Cookham)	Thames																														✓	✓
	GB106039023231 – Thames (Cookham to Egham)	Thames														✓																✓	✓
	GB106039023232 – Thames (Egham to Teddington)	Thames			✓	✓		✓																								✓	✓
	GB106039017440 - Hogsmill	Thames																												?			
	GB106038027910 – Pymmes and Salmon Brooks – Deephams STW to Tottenham Locks	Thames											✓																				
	GB106038027950 – Lea Navigation Enfield Lock to Tottenham Locks	Thames								✓			✓																				
	GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks	Thames								✓			✓																				
	GB109054049880 - Vrynwy - Lake Vrynwy to conf Afon Cownwy	Severn																														✓	
	GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy	Severn																														✓	
	GB109054049852 - Afon Vyrnwy DS of Banwy confluence	Severn																														✓	
	GB109054049800 - Afon Vyrnwy - conf Afon Tanat to conf R Severn	Severn																														✓	

Table D.4 cont.

Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR SLARS Kidbrooke (SLARS1) 7 Ml/d	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Beckton Reuse 300 Ml/d (phased 150)	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	ITZ_North SWX to SWA 48	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	Severn-Thames Transfer 3	South East Strategic Reservoir Option 125Mm^3
River	GB104028046841 - Tame - R Rea to R Blythe	Trent																										✓	
	GB109055037112 - Wye - Hampton Bishop to conf Kerne Br	Severn																										✓	
	GB109055037111 - Wye - conf Walford Bk to Bigsweir Br	Severn																										✓	
	GB109054049142 - Severn - conf Bele Bk to conf Sundorne Bk	Severn																										✓	
	GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford	Severn																										?	
	GB109054044404 - Severn - conf R Avon to conf Upper Parting	Severn																										✓	
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber																							✓				
	GB104028046842 - Tame – conf two arms to R Rea	Humber																							✓				
TRAC	GB530603911402 Thames Middle	Thames							✓	?																			
Lake	GB30641523 – King Georges Reservoir	Thames								✓			✓																
	GB30641659 – William Girling Reservoir	Thames									✓																		
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames					✓								✓														
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	✓																✓										
	GB40601G500300 - North Kent Medway Chalk	Thames																	✓										
	GB40601G601000 - Vale of White Horse Chalk	Thames																✓								✓			
	GB40601G500500 – Kent Greensand Western	Thames					✓																						
	GB40602G602300 - Bromley Tertiaries	Thames																									✓		
	GB40601G60040 - Burford Jurassic	Thames																								✓			
	GB40402G992400 -Tame Anker Mease – Coal Measures Black Country	Humber																							✓				
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber																							✓				

Key: All WFD water bodies identified in programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant; ? uncertain
Grey highlight indicates no programme level in-combination effect considered likely.
Blue highlight indicates potential for programme level alone or in-combination effects, reviewed above.

NearO_RES programme

Table D.5 sets out the options included in the NearO_RES programme and the WFD water bodies they have been assessed for. Where there is potential for programme level alone or in-combination effects these are reviewed below.

In addition, it is re-stated that the Vyrnwy support element of a Severn-Thames Transfer require the collection and consideration of further evidence prior to confirming WFD compliance in the first three water bodies of the Afon Vyrnwy downstream of Vyrnwy Reservoir. These are 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.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

GB106039029750 - Churn (Baunton to Cricklade)

As set out in Appendix B, the Ashton Keynes groundwater (removal of constraints) element could influence the River Churn river water body and further evidence is required to confirm the extent of hydraulic connectivity. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. The WFD compliance assessment for this water body currently has uncertainty pending this further evidence. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.

GB106039023740 - Chalgrove Brook

As set out in Appendix B, the Britwell groundwater (removal of constraints) element could influence the Chalgrove Brook river water body. Further evidence is required to confirm the extent of hydraulic connectivity and any impacts on the aquatic ecology. The WFD compliance assessment for this water body currently has uncertainty pending further evidence. With further assessment and development of appropriate mitigation measures, the option may be WFD compliant but delivery of the appropriate mitigation measures could be challenging.

GB106039017440 - Hogsmill

As set out in Appendix B, the Epsom groundwater (removal of constraints) element has the potential to baseflow in the Hogsmill River. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. A 3rd party flow augmentation is currently operated on a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through appropriate mitigation measures, if adverse impacts are identified in the investigation. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of adverse effects requires further investigation and is currently assessed as having a degree of uncertainty, prior to the completion of the planned investigation, and if necessary, inclusion of additional mitigation. The mitigation could include extension of the existing river flow augmentation scheme and/or additional abstraction licence controls. With any required mitigation measures in place, WFD compliance can be secured.

GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford

As set out in Appendix B, the Minworth effluent transfer element of a support Severn-Thames Transfer option requires further consideration of the effect on sanitary, nutrient and chemical water quality, as well as water temperature and consequently aquatic ecology of mixing tertiary treated effluent into the River Avon downstream of Warwick, particularly under low river flow conditions in the River Avon. At present WFD compliance in this water body is considered as uncertain, subject to further investigation

and the potential need for additional mitigation which may be challenging to achieve WFD compliance.

Table D.5 Summary of in-combination WFD compliance assessment of the NearO_RES programme

WFD water body			Option																							
Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Medmenham intake to SWA	Kempton WTW new 100 Ml/d	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	Severn-Thames Transfer
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames																		✓				✓
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames																		✓				
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames																		✓				
	GB106039029750 - Churn (Baunton to Cricklade)	Thames																			?			
	GB106039023740 - Chalgrove Brook	Thames																				?		
	GB106039030334 - Thames (Evenlode to Thame)	Thames									✓													✓
	GB106039030331 - Thames (Wallingford to Caversham)	Thames													✓									✓
	GB106039023233 - Thames (Reading to Cookham)	Thames															✓							✓
	GB106039023231 – Thames (Cookham to Egham)	Thames											✓											✓
	GB106039023232 – Thames (Egham to Teddington)	Thames		✓		✓																		✓
	GB106039017440 - Hogsmill	Thames																					?	
	GB106038027910 – Pymmes and Salmon Brooks – Deephams STW to Tottenham Locks	Thames								✓														
	GB106038027950 – Lea Navigation Enfield Lock to Tottenham Locks	Thames								✓														
	GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks	Thames								✓														
	GB109054049880 - Vrynwy - Lake Vrynwy to conf Afon Cownwy	Severn																						✓
	GB109054049720 - Afon Vyrnwy - conf Afon Cownwy to conf Afon Banwy	Severn																						✓
	GB109054049852 - Afon Vyrnwy DS of Banwy confluence	Severn																						✓
	GB109054049800 - Afon Vyrnwy - conf Afon Tanat to conf R Severn	Severn																						✓
	GB104028046841 - Tame - R Rea to R Blythe	Trent																						✓
	GB109054049142 - Severn - conf Bele Bk to conf Sundorne Bk	Severn																						✓
	GB109054044402 - Avon (Wark) conf R Leam to Tramway Br, Stratford	Severn																						?
	GB109054044404 - Severn - conf R Avon to conf Upper Parting	Severn																						✓
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber																		✓				

Table D.5 cont.

WFD water body			Option																								
Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR Merton (SLARS3) 5 Ml/d	ASR South East London (Addington) 1 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Medmenham intake to SWA	Kempton WTW new 100 Ml/d	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	Severn-Thames Transfer
River	GB104028046842 - Tame – conf two arms to R Rea	Humber																		✓				
TRAC	GB530603911402 Thames Middle	Thames					✓																	
Lake	GB30641523 – King Georges Reservoir	Thames								✓														
	GB30641659 – William Girling Reservoir	Thames						✓																
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames			✓							✓												
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	✓													✓								
	GB40601G500300 - North Kent Medway Chalk	Thames														✓								
	GB40601G601000 - Vale of White Horse Chalk	Thames													✓							✓		
	GB40601G500500 – Kent Greensand Western	Thames			✓																			
	GB40602G602300 - Bromley Tertiaries	Thames																					✓	
	GB40601G60040 - Burford Jurassic	Thames																			✓			
	GB40402G992400 -Tame Anker Mease – Coal Measures Black Country	Humber																		✓				
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber																		✓				

Key: All WFD water bodies identified in programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant; ? uncertain
Grey highlight indicates no programme level in-combination effect considered likely.
Blue highlight indicates potential for programme level alone or in-combination effects, reviewed above.

NearO_TP programme

Table D.6 sets out the options included in the NearO_TP programme and the WFD water bodies they have been assessed for. There are no programme level effects for this programme, either alone or in-combination.

Table D.6 Summary of in-combination WFD compliance assessment of the NearO_TP programme

WFD water body									
Type	**ID and name**	**River Basin District**	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Didcot Raw Water Purchase	Kempton WTW new 100 Ml/d	Medmenham intake to SWA	South East Strategic Reservoir Option 150Mm^3
River	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames							✓
	GB106039030334 - Thames (Evenlode to Thame)	Thames				✓			✓
	GB106039030331 - Thames (Wallingford to Caversham)	Thames							✓
	GB106039023233 - Thames (Reading to Cookham)	Thames						✓	✓
	GB106039023231 – Thames (Cookham to Egham)	Thames							✓
	GB106039023232 – Thames (Egham to Teddington)	Thames							✓
TRAC	GB530603911402 Thames Middle	Thames	✓						
Lake	GB30641659 – William Girling Reservoir	Thames		✓					

Key: All WFD water bodies identified in programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant
Grey highlight indicates no programme level in-combination effect considered likely. .

Min_IGEQ programme

Table D.7 sets out the options included in the Min_IGEQ programme and the WFD water bodies they have been assessed for. Where there is potential for programme level alone or in-combination effects these are reviewed below.

This programme includes the Deephams Reuse option and the 15Ml/d Oxford Canal Transfer to Cropredy option with the same WFD issues as set out in the Least Cost programme.

GB106039029750 - Churn (Baunton to Cricklade)

As set out in Appendix B, the Ashton Keynes groundwater (removal of constraints) element could influence the River Churn river water body and further evidence is required to confirm the extent of hydraulic connectivity. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the WINEP in AMP7. The WFD compliance assessment for this water body currently has uncertainty pending this further evidence. With further assessment and development of appropriate mitigation measures, the option is likely to be WFD compliant.

GB106039023740 - Chalgrove Brook

As set out in Appendix B, the Britwell groundwater (removal of constraints) element could influence the Chalgrove Brook river water body. Further evidence is required to confirm the extent of hydraulic connectivity and any impacts on the aquatic ecology. The WFD compliance assessment for this water body currently has uncertainty pending further evidence. With further assessment and development of appropriate mitigation measures, the option may be WFD compliant but delivery of the appropriate mitigation measures could be challenging.

GB106039017440 - Hogsmill

As set out in Appendix B, the Epsom groundwater (removal of constraints) element has the potential to baseflow in the Hogsmill River. The extent of impact of the licence (including to licence capacity which this option would enable) will be subject to review of its sustainability under the Water Industry National Environment Programme (WINEP) in AMP7. A 3rd party flow augmentation is currently operated on a tributary of the Hogsmill River at Ewell. The proposed increase in abstraction at Epsom (within current licence) may be accommodated through appropriate mitigation measures, if adverse impacts are identified in the investigation. This could include an increase in flow augmentation at Ewell, however this is subject to the planned investigation and would be agreed with the Environment Agency. The risk of adverse effects requires further investigation and is currently assessed as having a degree of uncertainty, prior to the completion of the planned investigation, and if necessary, inclusion of additional mitigation. The mitigation could include extension of the existing river flow augmentation scheme and/or additional abstraction licence controls. With any required mitigation measures in place, WFD compliance can be secured.

Table D.7 Summary of in-combination WFD compliance assessment of the Min_IGEQ programme

WFD water body			Option																												
Type	ID and name	River Basin District	Aquifer Storage and Recovery (ASR) Horton Kirby	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Honor Oak	Medmenham intake to SWA	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	South East Strategic Reservoir Option 150Mm^3	Wessex to SWOX (Flaxlands)
River	GB106039037310 – Cherwell (Cropredy to Nell Bridge)	Thames																				✓								
	GB106039037431 - Cherwell (Nell Bridge to Bletchingdon)	Thames																				✓								
	GB106039037432 - Cherwell (Bletchingdon to Ray)	Thames																				✓								
	GB106039029750 - Churn (Baunton to Cricklade)	Thames																					?							
	GB106039023740 - Chalgrove Brook	Thames																						?						
	GB106039023360 - Cow Common Brook and Portobello Ditch	Thames																									✓			
	GB106039030334 - Thames (Evenlode to Thame)	Thames									✓																✓			
	GB106039030331 - Thames (Wallingford to Caversham)	Thames													✓												✓			
	GB106039023233 - Thames (Reading to Cookham)	Thames																✓									✓			
	GB106039023231 – Thames (Cookham to Egham)	Thames											✓														✓			
	GB106039023232 – Thames (Egham to Teddington)	Thames		✓	✓	✓																					✓			
	GB106039017440 - Hogsmill	Thames																								?				
	GB106038027910 – Pymmes and Salmon Brooks – Deephams STW to Tottenham Locks	Thames								✓																				
	GB106038027950 – Lea Navigation Enfield Lock to Tottenham Locks	Thames								✓																				
	GB106038077852 – Lee Tottenham Locks to Bow Locks/Three Mills Locks	Thames								✓																				
	GB106039023270 - Ravensbourne (Catford to Deptford)	Thames															✓													
	GB104028046930 - Tame (W/ton Arm) source to conf Oldbury	Humber																				✓								
	GB104028046842 - Tame – conf two arms to R Rea	Humber																				✓								
TRAC	GB530603911402 Thames Middle	Thames					✓																							

Table D.7 cont.

WFD water body			Option																												
Type	**ID and name**	**River Basin District**	Aquifer Storage and Recovery (ASR) Horton Kirby	AR Streatham (SLARS2) 5 Ml/d	AR Merton (SLARS3) 5 Ml/d	ASR Thames Valley/Thames Central 3 Ml/d	Beckton Desalination 150	Chingford Raw Water Purchase	Coppermills WTW extension 100 Ml/d	Deephams Reuse	Didcot Raw Water Purchase	Groundwater Addington 1 Ml/d	Groundwater Datchet 6Ml/d	Groundwater London confined Chalk (north) 2 Ml/d	Groundwater Moulsford 1 - 3.5 Ml/d	Groundwater Southfleet/ Greenhithe (new WTW) 8 Ml/d	Honor Oak	Medmenham intake to SWA	Kempton WTW new 100 Ml/d	Merton Recommissioning	New River Head - Removal of Constraints	Oxford Canal to Cropredy Resource 15 Ml/d	RC Ashton Keynes borehole pumps 2.5 Ml/d	RC Britwell 1.31 Ml/d	RC Epsom borehole pumps - 2.13Ml/d (groundwater scheme)	South East Strategic Reservoir Option 150Mm^3	Wessex to SWOX (Flaxlands)
Lake	GB30641523 – King Georges Reservoir	Thames								✓																			
	GB30641659 – William Girling Reservoir	Thames						✓																					
Ground water	GB40601G602200 - Epsom North Downs Chalk	Thames										✓																	
	GB40601G501800 - West Kent Darent and Cray Chalk	Thames	✓													✓													
	GB40601G500300 - North Kent Medway Chalk	Thames														✓													
	GB40601G601000 - Vale of White Horse Chalk	Thames													✓										✓				
	GB40602G602300 - Bromley Tertiaries	Thames																								✓			
	GB40601G60040 - Burford Jurassic	Thames																					✓						
	GB40402G992400 -Tame Anker Mease – Coal Measures Black Country	Humber																				✓							
	GB40401G301000 - Tame Anker Mease – PT Sandstone Birmingham Lichfield	Humber																				✓							

Key: All WFD water bodies identified in programme listed.
Option assessed for WFD compliance in this water body individually and assessed as: ✓ compliant; ? uncertain
Grey highlight indicates no programme level in-combination effect considered likely.
Blue highlight indicates potential for programme level alone or in-combination effects, reviewed above.

APPENDIX E:
TEDDINGTON DIRECT RIVER ABSTRACTION WFD COMPLIANCE ASSESSMENT OUTCOME

This section presents the outcomes of the WFD compliance assessment for the Teddington DRA scheme.

Thames Water has taken account of the representations made on the draft WRMP19 WFD assessment of this option, notably those from the Environment Agency and the updated information presented in this Appendix has been informed by the further dialogue with the Environment Agency, and with other interested stakeholders, during spring and summer 2018 on this scheme. As a result of this further consultation, Thames Water has concluded that the WFD issues relating to temperature effects of the Teddington DRA scheme cannot reliably be mitigated to prevent the risk of WFD deterioration based on the current assessment work carried out. Consequently, this scheme has been removed as an option from the Feasible List for the WRMP19.

For completeness, the WFD compliance assessment of the Teddington DRA scheme taking account of the current mitigation measures discussed with the Environment Agency is presented below.

As communicated to stakeholders at our August 2018 Water Resources Forum, Thames Water will continue to investigate this scheme to seek to identify a cost-effective and feasible solution to the WFD compliance challenge that we are unable to resolve currently in dialogue with the Environment Agency and other interested stakeholders. Further details are provided in Appendix L of the WRMP19.

Resource: River Abstraction - Direct River Abstraction - Teddington Weir (Mogden Effluent Transfer) 300 Ml/d - RES-DRA-TED

water body

WFD water body name	Thames (Egham to Teddington)		
WFD water body type	River		
WFD management catchment	Maidenhead to Sunbury	**WFD water body ID**	GB106039023232
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Poor	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	YES	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** Construction of the new outfall for discharge of enhanced treated effluent from Mogden STW upstream of Teddington Weir. Outfall with appropriate fish screens to meet Eel Regulations and a design that is effective in restricting channel velocity increases to local around the outfall, and only affecting part of the channel width, with velocity changes kept off the right bank. Construction of a new abstraction intake with appropriate fish screens, particularly to meet Eel Regulations.
	Operation: New discharge of enhanced treated effluent upstream of Teddington Weir with corresponding reduction in final effluent discharged at Mogden STW outfall to the Upper Thames Tideway at Isleworth Ait (located in Thames Upper TRAC (GB530603911403)). A new abstraction licence will be required for the abstraction of river water from the River Thames at Kingston-Upon-Thames. Option element assessed at full capacity (300 Ml/d) and using existing operational triggers for Thames Water's existing strategic schemes, such as Thames Gateway Water Treatment (desalination) Plant. Subject to discharge permit conditions, enhanced treated effluent such that discharge is low phosphate, low BOD, low suspended solids, low ammonia and dissolved oxygen concentration that at least matches that of the River Thames local to the outfall.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Not assessed	Uncertain	Construction will be managed by good practice construction methods and any risk to the water body is assessed as low. Temporary effects due to construction will not cause deterioration of the water body. The abstraction intake site will be located in Kingston-Upon-Thames on the north side of the River Thames upstream of the Mogden STW effluent transfer discharge. The scheme would be planned to be operational for periods once every two years. Overall, the scheme would be operational for ~18% of the time, with a probability of it being operational for less than 100 days of the year. The scheme will need to be agreed and consented/licensed by the Environment Agency to ensure no deterioration to WFD ecological status. Up to 300Ml/d of Mogden STW effluent will be subject to tertiary treatment at the Mogden STW site. The discharge will be treated to tertiary standards for ammonia, phosphate, BOD and total suspended solids; therefore there will be a low risk of impacting the physico-chemical quality elements of this river water body (currently at moderate status). The discharge will be treated using ferric addition, nitrifying sand filters and mechanical filters. Modelling currently indicates that the river water temperature will increase by up to 3˚C in autumn (potentially more in winter) in the short reach between the new outfall and Teddington Weir, unless measures are taken to mitigate this effect. Modelling currently indicates the discharge could amend velocities between the new outfall and Teddington Weir, unless mitigated. Modelling currently indicates that the location of the abstraction intake upstream of the Mogden STW transfer could result in a change
Macro-invertebrates	Good	Uncertain	
Macrophytes & Phytobenthos	Poor	Uncertain	

				in the hydrodynamics with backwaters occurring once every five years. Although fish status is not assessed, because of limitations of the FCS2 classification tool in large rivers, impacts on migratory salmonids and resident fish from water temperature and velocity changes between intake and outfall would be likely. Water temperature effects also present a risk to early emergence of macroinvertebrates emerging in early spring. Increased residence time between intake and outfall may affect algal community and dominance of invasive non-native species (e.g. floating pennywort already present).
	Chemical (Overall)	Good	Uncertain	Further assessment of the pollutant concentrations in the tertiary treated effluent is required.
	Protected Area Details			Drinking water: The water body is a drinking water protected area. The discharge will be tertiary treated and designed to avoid risks to drinking water quality. Nutrient sensitive areas: The water body is associated with a nutrient sensitive area under the Nitrates Directive and the River Thames is a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, the scheme will not affect the management of the protected area and no significant changes in water quality are expected or would be permitted through the EA discharge permit process. South West London water bodies SPA (and Ramsar): the site comprises a series of water supply reservoirs and former gravel pits that support a range of man-made and semi-natural open-water habitats. There will be no impact on the European site because there are no impact pathways to the site from this scheme.
	Does the component comply with WFD Objective			
	1. No deterioration between status classes			Uncertain. Further work has been undertaken by Thames Water since publication of the dWRMP setting out both: 1) an ecological need for mitigation of temperature effects of a DRA option in the freshwater River Thames and estuarine Tideway; and 2) potential mitigation approaches. The findings were discussed at meetings with the Environment Agency on 1 May 2018 and consequently on 13 July 2018. Based on these further discussions since the dWRMP position, both parties agree that the compliance with WFD objectives of a Teddington DRA option remains uncertain. Research to date has not been sufficient to satisfactorily determine the required extent of, or to identify, a viable mitigation option to deliver WFD compliance with certainty. In consequence, a Teddington DRA option cannot be considered a feasible option in a proposed WRMP programme at this time.
	2. No impediments to GES/GEP			Yes; no impediments to GEP.
	3. No compromises to water body objectives			Yes; no compromises to water body objectives.
	4. No effects on other water bodies			Uncertain; Modelling has identified potential effects on Thames Upper TRAC water body (GB530603911403)
	5. Assists attainment of water body objectives			No; does not assist with attainment of water body objectives.
	6. Assists attainment of protected area objectives			No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Thames Upper			
WFD water body type	Transitional Water			
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911403	
River Basin District	Thames			

WFD Designations, Objectives and Mitigation			
WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation	heavily modified		
Water Body Mitigation Measures	No published mitigation measures		

WFD Protected Areas						
Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	NO	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** n/a **Operation:** A reduction in the volume of treated effluent at the Mogden STW outfall to the Thames Tideway at Isleworth Ait, potentially to as low as 20Ml/d. A change in the composition (but not the rate) of the water passed forward from the River Thames at Teddington Weir (see upstream water body Thames (Egham to Teddington) (GB106039023232)). Option element assessed at full capacity (300 Ml/d) and using existing operational triggers for Thames Water's existing strategic schemes, such as Thames Gateway Water Treatment (desalination) Plant.

WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Uncertain	There will be a continued, but lower rate, of discharge from Mogden STW at Isleworth Ait into the Tideway with potentially amended flow conditions due to the change in composition of the pass-forward river flows at Teddington Weir. Although the option is likely operational for periods once every two years these effects are particularly likely when the scheme is in operation at the Teddington pass-forward flow of 300Ml/d (which is assessed as likely once every 5 years). Modelling of the water passed forward has currently identified there is the potential for minor changes in tidal levels and inter-tidal exposure, minor exacerbation of brackish water conditions where these are already present and a temperature increase of up to 3˚C in autumn (potentially more in winter) particularly in upper parts of the water body. Without additional mitigation, these effects, on average occurring every 5 years when the scheme is required to operate, could impact on diadromous fish and freshwater fish. Although invertebrate status is not assessed, because of limitations of the IQI classification tool in very low brackish environments, there are potential impacts on invertebrates and invasive non-native invertebrate species from water temperature without additional mitigation.
Invertebrates	Not assessed	Uncertain	
Macroalgae	Not assessed	Not assessed	
Phytoplankton	High	High	
Angiosperms	Not assessed	Not assessed	
Chemical (Overall)	Good	Uncertain	Modelling has currently identified that when the pass-forward flow at Teddington Weir is dominated by diverted effluent (at Teddington flows of 600Ml/d or less), there is a risk of increases in the concentration of chemicals in the upper Tideway water body as a result of reduced dilution and dispersion. The scheme will be needed to be agreed and consented with the Environment Agency to ensure no deterioration to WFD chemical status.
Protected Area Details		Nutrient sensitive areas: The transitional water body is associated with a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, no significant changes in water quality are expected or would be permitted through EA discharge permit process.	

Does the component comply with WFD Objective	
1. No deterioration between status classes	Uncertain. Further work has been undertaken by Thames Water since publication of the dWRMP setting out both: 1) an ecological need for mitigation of temperature effects of a DRA option in the freshwater River Thames and estuarine Tideway; and 2) potential mitigation approaches. The findings were discussed at meetings with the Environment Agency on 1 May 2018 and consequently on 13 July 2018. Based on these further discussions since the dWRMP position, both parties agree that the

		compliance with WFD objectives of a Teddington DRA option remains uncertain. Uncertainty remains, in a WFD context, around the required extent of temperature mitigation of a Teddington DRA option. Research to date has not been sufficient to satisfactorily determine the required extent of, or to identify, a viable mitigation option to deliver this. In consequence, a Teddington DRA option cannot be considered a feasible option in a proposed WRMP programme at this time.
	2. No impediments to GES/GEP	Yes; no impediments to GEP.
	3. No compromises to water body objectives	Yes; no compromises to water body objectives.
	4. No effects on other water bodies	Yes; following review of potential effects on the Thames Middle TRAC water body (GB530603911402) assessed below
	5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
	6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

Water body

WFD water body name	Thames Middle		
WFD water body type	Transitional Water		
WFD management catchment	Thames TraC	**WFD water body ID**	GB530603911402
River Basin District	Thames		

WFD Designations, Objectives and Mitigation

WFD Status and Objectives	**RBMP2 Overall Status**	**Objective (2021)**	**Objective (2027)**
	Moderate	-	-
Hydromorphological designation		heavily modified	
Water Body Mitigation Measures	49.Modify vessel design 50.Vessel Management 26.Sediment management 27. Dredge disposal site selection 28.Manage disturbance	21.Avoid the need to dredge 22.Dredging disposal strategy 23.Reduce impact of dredging 24.Reduce sediment resuspension 25.Retime dredging or disposal	

WFD Protected Areas

Bathing Water Directive	**Drinking Water Directive**	**Conservation of Wild Birds Directive**	**Habitats Directive**	**Nitrates Directive**	**Shellfish Directive**	**Urban Waste Water Treatment Directive**
NO	NO	YES	NO	YES	NO	YES

WFD assessment (scoping)

Scheme components potentially affecting water body	**Construction:** n/a – no construction activities in this water body. **Operation:** Changes in the rate and composition of the water passed forward from the upstream Thames Upper water body (GB530603911403).		
WFD element	**RBMP2 (2015) status**	**Assessed status (construction and operation)**	
Fish	Good	Good	Modelling has currently identified that, every five years on average, there is the potential for minor exacerbation of brackish water conditions in this water body where these are already present, potentially resulting in a change of distribution of freshwater fish present in the upper and middle parts of this water body (from EA monitoring sites at Battersea and Gravesend where the same freshwater fish species and similar distributions are present) on average every 5 years (or lower frequency). Any temporary redistribution not considered to affect overall water body status.
Invertebrates	Good	Good	
Macroalgae	Good	Good	
Phytoplankton	High	High	
Angiosperms	Moderate	Moderate	
Chemical (Overall)	Good	Good	No impact transferred from the upstream water body.
Protected Area Details	Nutrient sensitive areas: The transitional water body is associated with a nutrient sensitive area under the Urban Waste Water Treatment Directive. However, no significant changes in water quality are expected or would be permitted through EA discharge permit process. Thames Estuary & Marshes SPA (and Ramsar): The closest part of the site is over 60km from this option. Given the distance and the fact that no significant water quality or hydrodynamics are expected, there will be no impact on this European site.		

Does the component comply with WFD Objective	
1. No deterioration between status classes	Yes; no risk of deterioration
2. No impediments to GES/GEP	Yes; no impediments to GEP.
3. No compromises to water body objectives	Yes; no compromises to water body objectives.
4. No effects on other water bodies	Yes; there are no potential effects on other water bodies.
5. Assists attainment of water body objectives	No; does not assist with attainment of water body objectives.
6. Assists attainment of protected area objectives	No; does not assist with the attainment of any mitigation measures required for the protected areas.

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