Affinity Water
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Thames Water

WATER for LIFE
from Southern Water

South East Strategic Reservoir Option (SESRO)

Supporting Document C1

Water Framework Directive (WFD) Assessment Report

J696-AC-A03X-ZWCZ-RP-EN-100001

Version: 1.0

Standard Gate three submission for SESRO

SRO

Notice – Position Statement

- This document has been produced as the part of the process set out by RAPID for the development of the Strategic Resource Options (SROs). This is a regulatory gated process allowing there to be control and appropriate scrutiny on the activities that are undertaken by the water companies to investigate and develop efficient solutions on behalf of customers to meet future drought resilience challenges.
- This report forms part of the suite of documents that make up the 'Gate 3 submission.' Gate 3 of the RAPID programme represents a checkpoint on the way to solutions being prepared for consent applications. The intention at this stage is to provide RAPID with an update on activities being undertaken in preparation for consent application submission; activities' progress including programme through to completion; and consideration of specific activities to address particular risks or issues associated with a solution. The regulatory gated process does not form part of the consenting process and will not determine whether an SRO is granted planning consent.
- Given the stage of the SROs in the planning process, the information presented in the Gate 3 submission includes material or data which is still in the course of completion, pending further engagement, consultation, design development and technical / environmental assessment. Final proposals will be presented as part of consent applications in due course.
- The project information captured in this document reflects a design freeze in October 2024 following the non-statutory consultation, to meet the requirements of RAPID's gated process. Since then, the design has continued to evolve which includes further work with Affinity Water and Southern Water partners to form agreed requirements for the development consent application, such as the incorporation of Southern Water's proposed water treatment works into the SESRO consent. You can find the latest information about the design and development of the project at https://thames-sro.co.uk/projects/sesro/.

Disclaimer

This document has been written in line with the requirements of the RAPID Gate 3 Guidance (v3, January 2024) and to comply with the regulatory process pursuant to Thames Water's, Southern Water's and Affinity Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in this document be taken forward, the co-sponsors will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This document should be read with those duties in mind.

Revision history

Version	Date	Submitted at
1.0	26-07-2025	RAPID submission

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Glossary

Term	Acronym/Definition
ACWG	All Company Working Group
A/HMWB	Artificial/Heavily Modified Water Body
Baseline	This term describes the existing nature of the water environment and WFD status within the study area at a fixed point in time.
BAP	Biodiversity Action Plan – An internationally recognized program addressing threatened species and habitats and is designed to protect and restore biological systems.
BNG	Biodiversity Net Gain – term used to describe the leaving of the environment in an improved state then at the start of a scheme.
CDR	Conceptual Design Report
Construction	Construction, also referred to as the construction phase, refers to all activity on and offsite required to implement the proposed development. The construction phase is considered to commence with the first activity on site, for example the creation of site access or site clearance works and ends with demobilisation.
DCO	Development Consent Order – application for a consent to undertake a NSIP which is made to the PINS.
Defra	Department of the Environment, Food and Rural Affairs – Defra is the government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the United Kingdom of Great Britain and Northern Ireland. Defra is a ministerial department, supported by 33 agencies and public bodies.
dRBMP3	Draft River Basin Management Plan Cycle 3.
EA	Environment Agency – A non-departmental public body with responsibilities relating to the protection and enhancement of the environment in England.
eDNA	Environmental deoxyribonucleic acid

Term	Acronym/Definition
EIA	Environmental Impact Assessment
EFI	Ecological Flow Indicator
EU	European Union
Effect	The nature of the change(s) likely to occur as a result of a particular impact.
Enhancement	Measures that seek to improve the landscape of the site and/or its wider setting beyond its baseline condition
EWD / Mere Dyke diversion	Eastern Watercourse Diversion / Mere Dyke diversion. In previous assessments, this diversion has been known as the Eastern Watercourse Diversion but has now been renamed as the Mere Dyke Diversion.
FCS2	Fisheries Classification System version 2
Gate	The first SRO gate. This stage is for initial concept design and decision making. This gate has been completed for SESRO.
Gate 2	The second SRO gate. This stage is for detailed feasibility, concept design and multi-solution decision making. SESRO is currently at this gate.
Gate 3	The third SRO gate. This stage is for develop design, finalised feasibility, pre-planning investigations and planning applications. The next stage for SESRO.
Gate 4	The fourth SRO gate. This stage is for planning applications, procurement and land purchase. To inform the EIA.
GCS	Good Chemical Status
GEP	Good Ecological Potential
GES	Good Ecological Status
GPP	Guidance for Pollution Prevention
Groundwater Directive	A directive specifically outlining requirements for groundwater bodies under the WFD Regulations
GWDTE	Groundwater Dependent Terrestrial Ecosystems

Term	Acronym/Definition
HMWB	Heavily Modified water body
HoF	Hands off Flow
Hyporheic zone	The region of sediment beneath and alongside the riverbed where there is mixing of surface and groundwater.
Impact Risk Zones (IRZ)	Impact Risk Zones (IRZs) are a GIS tool developed by Natural England to make an initial assessment of the likely risk of impacts on SSSIs posed by developments. The IRZs tool comprises a series of zones around each SSSI and within each zone, the tool specifies the types of development which, at that distance, have the potential to have adverse impacts.
INNS	Invasive Non-Native Species
Km	Kilometre
Land use	This term refers to what land is used for and is based on broad categories such as urban, industrial, agriculture or forestry.
Main River	Designated as Main Rivers rather than Ordinary Watercourses. The guidance for designation of 'main rivers' was issued under section 193E of the Water Resources Act 1991. The Environment Agency's Statutory Main River Map details the extent of these main rivers across the country, The Environment Agency carries out maintenance, improvement or construction work on main rivers to manage flood risk. Although usually larger rivers and streams, this is not always the case.
Mitigation Measures	Improvement measures that need to be delivered in HMWBs to attain Good Ecological Potential
mitigation measure	A measure in place to mitigate impacts of the proposed development. The difference can be noted by the lower case 'm' when compared with the 'Improvement measures that need to be delivered in HMWBs to attain Good Ecological Potential' which are noted with capital 'M's'.
NGR	National Grid Reference
NRW	Natural Resources Wales

Term	Acronym/Definition
NSIP	Nationally Significant Infrastructure Project
Operation	Also referred to as completion, this term describes the operation phase of the completed development and is considered to commence at the end of the construction phase, after demobilisation. The duration of the operation phase is dependent on the nature of the proposed development.
Ordinary watercourse	Any watercourse that is not designated as Main River. Lead local flood authorities, district councils and internal drainage boards carry out flood risk management work on ordinary watercourses.
PBDE	Polybrominated diphenyl ethers
PINS	Planning Inspectorate
PPGs	Pollution Prevention Guidelines
Programme of Measures (PoM)	Programme of Measures are actions that are outlined in the River Basin Management Plans (RBMPs) to address pressures to enable natural water bodies to achieve WFD objectives set out for them.
Project elements	The different parts of the proposed Project that make up the whole, such as the reservoir footprint or access road, which need to be assessed individually for their impact.
Q	Discharge within the watercourse at a specific return period e.g. Q95 demonstrates the discharge which is predicted to be exceeded 95% of the time.
Quality Elements	The WFD specifies which parameters are to be assessed for each water category (e.g. river, lake). These parameters are called Quality Elements. The biological Quality Elements can include fish, phytoplankton, invertebrates macrophytes etc.
RAPID	Regulators Alliance for Progressing Infrastructure Development
Raw Water	Non-Potable Water
RICT	River Invertebrate Classification Tool
RBD	River Basin District (RBD)

Term	Acronym/Definition
RBMPs	River Basin Management Plans
Regulation 19	Regulation 19 under WFD Regulation.
RNAG	'Reasons for Not Achieving Good' Status
SAGIS	The Source Apportionment Geographical Information System. A discrete ArcGIS-based digital information management and visualisation platform which serves as an integrated system for modelling water quality in rivers and lakes. Can be used in conjunction with SIMCAT where it is then known as SAGIS-SIMCAT.
Sensitivity (of a receptor)	A judgement regarding the susceptibility of a receptor to the change arising as a result of the proposed development and the value attached to the receptor.
SESRO	South-East Strategic Reservoir Option – the proposed Project
SIMCAT	Simulation of Catchments. Environment Agency's water quality model. Water quality management tool to support decision making for catchment management and discharge control. Can be used in conjunction with SAGIS where it is then known as SAGIS-SIMCAT.
SRO	Strategic Resource Option
SSSI	Site of Special Scientific Interest – A conservation designation denoting to a protected area in the United Kingdom. The Sites are protected by law to conserve their wildlife or geology.
Study area	The area within which it is considered that changes arising as a result of the proposed development would result in the highest and/or most important direct or indirect effects.
WB	Water body
WER	Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. WFD Regulation in England and Wales.
WFD	Water Framework Directive – The Water Framework Directive (2000/60/EC).

Term	Acronym/Definition
Worst case	Reasonable prediction of the scenario that would result in the highest level of effect(s).
WRSE	Water Resources in the South East
WTW	Water Treatment Works
WWD / Cow Common Brook diversion	West Watercourse Diversion / Cow Common Brook diversion. In previous assessments, this diversion has been known as the Western Watercourse Diversion but has now been renamed as the Cow Common Brook Diversion.
Zone of Influence (ZoI)	Potential spatial extent of the impacts of the proposed Project.

Executive Summary

This document presents a project-specific, Water Framework Directive (WFD) assessment for the proposed 150 Mm^3 South-East Strategic Reservoir Option (SESRO) Project ('the proposed Project'). The aims of the document are to provide:

- background information on the proposed Project and the WFD Regulations;
- a baseline understanding of the WFD water bodies that would be affected by the proposed Project;
- an assessment of the potential for the proposed Project to cause deterioration in the baseline WFD status of any water body; and,
- an assessment of the potential to impact any proposed water body improvement measures and therefore the ability to meet target WFD objectives.

As SESRO would have a capacity of over 30 million cubic metres, it is of the scale of project that would qualify as a Nationally Significant Infrastructure Project (NSIP) under section 14(1)(m) and section 27 (Dams and reservoirs) of the Planning Act 2008 that would need to be consented by a Development Consent Order (DCO). DCO applications are examined by an Examining Authority appointed by the Planning Inspectorate (PINS), which will make a recommendation to the Secretary of State (SoS) for the Department for Environment, Food and Rural Affairs (Defra) who will determine whether to grant consent. In 2024, the proposed Project has carried out non-statutory consultation following the development of an Interim Master Plan. The proposed Project will undergo further iterations of design development. This WFD assessment has been undertaken on the basis of this Interim Master Plan.[1]

The format of this WFD assessment has been adapted to align to the updated Planning Inspectorate Advice on the Water Framework Directive (PINS, 2024)[2] which details the expected format for WFD assessments for all Nationally Significant Infrastructure Projects. This has moved away from the All Company Working Group (ACWG) methodology that has previously been used for earlier versions of the WFD assessment.

The guidance suggests that a WFD compliance assessment comprise three key components:

- Stage 1 Screening assessment – to determine what activities associated with the Proposed Development require further consideration and what activities can be screened out at this stage of the process; for example, activities which have been ongoing since before the current River Basin Management Plan cycle so form part of the baseline;

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[1] *Thames Water, 2024, SESRO Interim Master Plan, June 2024*
[2] *Planning Inspectorate (PINS), 2016, Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive.*

- Stage 2 Scoping assessment – to identify risks of the Proposed Development activities to receptors based on relevant water bodies and their water Quality Elements; and,
- Stage 3 Impact assessment – a detailed impact assessment of the water bodies and their Quality Elements that are considered to likely be affected by the Proposed Development. Any potential issue for non-compliance would be highlighted at this stage along with consideration of mitigation measures and enhancements that would contribute to WFD and RBMP objectives.

The proposed location of the works lies within the Thames River Basin District, which is covered by the Thames River Basin Management Plan (RBMP). The main site is within the Gloucestershire and the Vale Management Catchment and the Ock Operational Catchment. However, as the volume of water in the River Thames may be altered, due to the abstraction to and augmentation from the reservoir, water bodies on the River Thames need to be considered, from the nearby Evenlode to Thame WFD water body as far as the tidal limit (Teddington Weir). These water bodies are in the South Chilterns and Lower Thames Operational Catchments, and Thames and South Chilterns and Maidenhead and Sunbury Management Catchments.

The footprint of the proposed Project interacts with watercourses within six WFD surface water bodies in the River Ock Operational Catchment, namely:

- Childrey Brook and Norbrook at Common Barn (GB106039023380);
- Sandford Brook (Source to Ock) (GB106039023410);
- Cow Common Brook and Portobello Ditch (GB106039023360);
- Ginge Brook and Mill Brook (GB106039023660);
- Ock and tributaries (Land Brook confluence to Thames) (GB106039023430); and,
- Thames (Evenlode to Thame) (GB106039030334).

The Stage 1 Screening Assessment assesses where the proposed Project design may impact the WFD water bodies and identifies the Zone of Influence (ZoI) which is determined as water body catchments containing the reservoir footprint and ancillary infrastructure and the River Thames down to Teddington which is the downstream extent of the hydraulic influence. It screens in those water bodies that need further assessment and screens out those that will not be impacted (and therefore where there is no risk of non-compliance with WFD).

Ten surface water bodies are screened into the scoping assessment as part of the Stage 1 screening. Five water bodies are on the River Thames and five water bodies are tributaries within the River Ock catchment. There are 13 project activities (including construction and operational activities) which have been identified as having the potential to impact on these water bodies. The construction activities are sub divided with only one activity being Scoped in for further assessment. All operational Project activities are considered to have the potential to cause deterioration and/or prevention

of future objectives. As a result, these all required further assessment in the Impact Assessment.

Two groundwater bodies are located within 2km of the site: i) Shrivenham Corallian (GB40602G60060) and Vale of White Horse Chalk (GB40601G601000). However, it has been determined that no Project activities have the potential to impact on the groundwater bodies. Therefore, impacts to WFD groundwater bodies are screened out of further assessment. There are no Groundwater Dependant Terrestrial Ecosystems (GWDTEs) within the Project footprint and groundwater modelling has shown those in close proximity to the proposed Project which include Frilford Heath, Ponds and Fens, Barrow Farm Fen, and Cothill Fen to the north and Marcham Springs to the south of these sites will be unaffected by the construction. Thus, Groundwater Dependant Terrestrial Ecosystems (GWDTEs) have been screened out of further assessment.

The Stage 2 Scoping assessment has determined that the Project does not have the potential to prevent the attainment of any of the Mitigation Measures associated with the Heavily Modified Water Bodies (HMWB) in the ZoI i.e. the River Thames WFD water bodies downstream of the proposed intake/outfall structure. It was also determined that the Project will not prevent the achievement of any of the Programme of Measures (PoM) associated with the water bodies in this assessment which are outlined within the RBMP. Therefore, the assessment of these two elements have been scoped out of further consideration.

The Stage 3 Impact Assessment assesses how each of the water bodies that were scoped in during the Stage 2 Scoping Assessment would be impacted by SESRO. In particular, the project activities are reviewed to determine the potential impacts on the water quality, hydromorphology and aquatic ecology.

On the River Ock and the associated tributaries, the footprint of the reservoir and the ancillary infrastructure are likely to have the greatest impacts on the WFD water bodies compared with other Project activities. The watercourses impacted by the footprint will diverted and improved through embedded mitigation across the site via the diversions of various watercourses around the perimeter of the reservoir (including Cow Common Brook diversion, East Hanney Ditch diversion and Mere Dyke diversion) as well as additional channel realignments, such as those on the River Ock and the Landmead Ditch. In addition, the reservoir has the potential to change flows and water quality in the surrounding water bodies with knock on impacts to the hydromorphology supporting element and aquatic ecology Quality Elements.

Detailed hydrodynamic modelling has been undertaken for the River Ock in Gate 3 and builds on the Gate 2 modelling work. Despite small reductions in river flow as a result of loss of catchment under the reservoir footprint, at the three locations investigated within the River Ock and tributaries catchments (Cow Common Brook, Childrey Brook and River Ock), impacts on water quality were small. A notable risk to the biological Quality Elements on the River Ock and its tributaries relates to construction activities including

the installation of crossings, the creation of watercourse diversions and the temporary loss of ditch habitats. With embedded mitigation in place, construction impacts are likely to be temporary with some short term loss in habitat and species, but it will over time provide a greater habitat quality as a result of the mitigation design. As such, it is expected that there will be beneficial changes in biological Quality Elements once water course diversions are complete and these have been recolonised, with the potential to improve the overall ecological integrity of the associated watercourses in the mid to longer-term. The risk of non-compliance in view of the Ecological Flow Indicator (EFI) was also considered with the assessment indicating that the flows at the River Ock Assessment Point (located at the confluence with the River Thames) will remain complaint.

On the River Thames, potential impacts are related to both the abstraction and augmentation from this water body and how it may affect downstream water bodies. There would also be a localised impact on the physical habitat (river bank and small portion of river bed) of the River Thames due to the presence of the intake/outfall structure. The potential impacts on fish communities as a result of the operation of the intake has also been subject to assessment. Screen design will be in view of Best Available Technology. Furthermore, the expected operation of the intake (when flows are >Q50) will ensure that sweeping flows are sufficient to avoid entrainment. In addition, the operation of the intake will be outside of summer months (summer intake occurs but is very unusual) which is outside the main coarse fish spawning period and reduces the risk to fish fry.

The change in flow in the River Thames as a result of both abstraction and augmentation has the potential to impact water quality and the subsequent changes on hydromorphology and aquatic ecology. Detailed hydrodynamic modelling has been undertaken for the River Thames in Gate 3 and builds on the Gate 2 modelling work. Overall, the water quality modelling results show that immediately downstream of the SESRO augmentation there will be an improvement in water quality as a result of the augmentation of water from SESRO. The only slight decline predicted are transient small changes in BOD, Ammoniacal Nitrogen and Chlorophyll-a with no clear change to longer term water quality statistics. Therefore, it is not predicted that the WFD physico-chemical Quality Elements will change. When considering abstraction activities, the available modelling suggests that there could be a slight reduction in flows above Q_{40} with no discernible change in flows between Q_{40} and Q_{70}. Higher flows would remain within the range that is considered “normal” for the River Thames. Lower flows would remain protected from abstraction activities as a result of a Hands off Flow (HoF) at Sutton Courtenay (HoF of Q_{50}). Furthermore, operational controls will be in place so that abstraction is limited to 1,000 Ml/d and will not increase by more than 300 Ml/d until a maximum of 1,000 Ml/d is reached. As a result, the ecological and hydromorphological functions performed by higher flows remain.

The available modelling data suggest that, when operational, discharges from SESRO would augment lower flows. This means that the release from SESRO could offset some

of the impacts of extreme low flow events. The Thames (Evenlode to Thame) surface water body would remain compliant with the EFI (based on current Q_{95} and a future predicted Q_{95}). Furthermore, augmentation of extreme low flows would result in important ecological functions being maintained.

The overall assessment concludes that the proposed Project will not result in deterioration of any Quality Element of the water bodies screened in and will not prevent the future attainment of objectives. These findings are dependent on the successful implementation of the embedded mitigation outlined as part of the design and construction activities. Additional mitigation may be required should other impacts be identified.

It is also important to note that the reservoir itself would likely be considered a WFD Lake water body in the future. A number of nutrient reduction initiatives are currently proposed within the River Thames catchments upstream of the SESRO intake, including AMP8/AMP9 improvements at Sewage Treatment Works operated by Thames Water. These future reductions have been factored into the River Thames water quality predictions for the River Thames for the year 2040 when the reservoir would be operational. Model predictions currently suggest that this could improve the quality of water taken into SESRO so the water in the reservoir itself becomes indicative of 'good' status for total phosphorus. This future prediction however has some uncertainty and will need to be reviewed over time, as and when nutrient reductions initiatives are delivered and confirmed through water quality sampling.

1. Introduction

1.1 Background

1.1.1 The assessment builds upon, and furthers, work undertaken at Gate 1 and 2 of the Regulators Alliance for Progressing Infrastructure Development (RAPID) gated process and by Water Resources South-East (WRSE). WRSE undertook a high-level screening assessment of WFD compliance of the SESRO options using the WRSE All Company Working Group (ACWG) methodology.[3] For the WRSE method, a standardised approach was used as part of wider optioneering to assess a range of strategic options. The screening process reviewed the various reservoir concept options and assessed the potential impacts on the various water bodies impacted by the proposed Project using a scoring system. The assessment undertaken as part of Gate 2 went further by examining each of the proposed options in more detail and assessing whether (and where possible, how) individual Project elements are likely to impact WFD water bodies. The report was a RAPID deliverable and was undertaken for all six potential SESRO Strategic Resource Options (SRO).[4] The six options were as follows:

- SESRO – 75 Mm³
- SESRO – 100 Mm³
- SESRO – 125 Mm³
- SESRO – 150 Mm³
- SESRO – 30+100 Mm³
- SESRO – 80+42 Mm³

1.1.2 The SESRO – 150 Mm³ (in the remainder of the report this is referred to as SESRO) non-impounding raw water reservoir option was selected in the Thames Water 2024 Water Resources Management Plan (WRMP24) preferred pathway and hence only this option is assessed in Gate 3.

1.1.3 As SESRO would have a capacity of over 30 million cubic metres, it is of the scale of project that would qualify as a Nationally Significant Infrastructure Project (NSIP) under section 14(1)(m) and section 27 (Dams and reservoirs) of the Planning Act 2008 that would need to be consented by a Development Consent Order (DCO). DCO applications are examined by an Examining Authority appointed by the Planning Inspectorate (PINS), which will make a recommendation to the Secretary of State (SoS) for the Department for

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[3] *WRSE, 2020, All Company Working Group Water Framework Directive: Consistent framework for undertaking no deterioration assessments, Section 3.3.2 level 1 basic screening, Mott MacDonald 2020*

[4] *Atkins, 2023a, SESRO Gate 2 Water Framework Directive Assessment.*

Environment, Food and Rural Affairs (Defra) who will determine whether to grant consent.

1.1.4 The WFD assessment detailed in this document is being completed as part of Gate 3 of the design process. It uses a greater level of design detail that is now available following development of the proposed Project during the Inter-Gate period between Gate 2 and 3 and further assessment undertaken in Gate 3, and findings of additional studies to update the Gate 2 WFD assessment. The Gate 3 WFD assessment is based upon the Interim Landscape and Environment Master Plan for SESRO which was developed in early 2024 along with the results from additional site surveys principally geomorphological walkover surveys. As such, it provides greater confidence and certainty on the likely WFD impacts and opportunities of the proposed Project. The next stage, Gate 4, is for planning applications, procurement and land acquisition which will also be used to inform the EIA.

1.1.5 The assessment presented in this document is provided in respect of the requirements of RAPID. A formal WFD assessment will be undertaken pursuant to the consenting process, supporting progression towards the Development Consent Order (DCO). The format of this WFD assessment has been adapted to align to Planning Inspectorate Advice on the Water Framework Directive (PINS, 2024)[2] which details the expected format for WFD assessments for all Nationally Significant Infrastructure Projects that will go through the DCO process. This has moved away from the All Company Working Group (ACWP) methodology that has previously been used for earlier versions of the WFD assessment.

1.2 Legislative Drivers

The Water Framework Directive

1.2.1 The WFD is an European Commission Directive which was transposed into law in England and Wales through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 ("the WFD Regulation"). As of 31 December 2020, the WFD Regulations became retained EU law, and the references in the WFD Regulations to the Water Framework Directive refer to the version of the Directive that was in force at the time when the WFD Regulations came into force (10 April 2017). Therefore, the principal legal basis is the WFD Regulations which currently mirror the EU Directive. In this report "WFD" refers to WFD *Regulations* applicable to England and Wales, not the EU Directive.

1.2.2 The WFD's principal aims are to protect and improve the water environment and promote the sustainable use of water. The headline environmental objectives of the WFD and its daughter directives are to:

- Prevent the deterioration of aquatic ecosystems; and,
- Protect, enhance and restore water bodies to Good Status; which is based on ecology (with its supporting hydromorphological and physico-chemical

factors) and chemical factors for surface water, and water quantity and Chemical Status for groundwaters. Where a water body is designated as Heavily Modified, or Artificial, the water body will need to meet Good Ecological Potential rather than Good Status.

Surface water bodies

1.2.3 The WFD sets a default objective for all rivers, lakes, estuaries, groundwater and coastal water bodies to achieve Good Status by 2027 at the latest. For natural surface water bodies, Good Status is a function of both Good Chemical Status (GCS) and Good Ecological Status (GES). The River Basin Management Plans (RBMPs) outline the actions required to enable natural water bodies to achieve these objectives through a PoM to address pressures. Artificial and Heavily Modified Water Bodies (A/HMWBs) are considered unable to attain GES due to the physical modifications that are necessary to maintain their function for society or their 'human use' as they provide important socio-economic benefits. They are, however, still required to achieve Good Ecological Potential (GEP), through the implementation of a series of Mitigation Measures outlined in the RBMP which aim to enhance the ecology in the water body without compromising its human use. A/HMWBs still need to attain GCS which, along with GEP will collectively result in Good Status in these water bodies.

1.2.4 New activities and projects that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical Quality Elements (WFD Quality Elements) that could lead to a deterioration in water body status. They may also preclude the implementation or effectiveness of the proposed improvement measures (including Mitigation Measures in A/HMWBs), leading to the water body failing to meet its WFD objectives for GES/GEP. Where this is the case, Regulation 19 would be invoked (see Section Regulation 19 below).

1.2.5 The overall ecological status of a water body is primarily based on consideration of its biological Quality Elements (phytoplankton, macrophytes, phytobenthos, benthic invertebrates and fish) and is determined by the lowest scoring of these elements. These biological elements are 'supported' by the physico-chemical (water quality) and hydromorphological (hydrological or tidal regime, river continuity and morphological conditions, i.e. habitat) Quality Elements.

1.2.6 To achieve GCS, a water body must pass a separate chemical status assessment, relating to pass/fail checks on the concentrations of various identified Priority Substances, Priority Hazardous Substances and Specific Pollutants.[5]

[5] *The Water Framework Directive (Standards and Classification) Directions (England and Wales, Schedule 1, 2015.*

Groundwater bodies

1.2.7 For the purposes of reporting under the WFD a groundwater body represent a distinct body of groundwater flow with a coherent flow unit including recharge and discharge areas with little flow across the boundaries. These reflect hydrogeological characteristics containing information on flow and stage properties, recharge and vulnerability to pollution.[6]

1.2.8 For groundwater bodies, good status has a quantitative and a chemical component. Both are measured on a scale of good or poor, and a confidence rating is assigned to the status assessment of high or low. Together, these provide a single final classification of either good or poor status. There is also a trend objective set for groundwater water bodies where environmentally significant and sustained rising trends in pollutant concentrations need to be identified along with a definition of the starting point (percentage of level or concentration) for trend reversal. Furthermore, the daughter directive of the WFD specifically concerning groundwater (the Groundwater Directive) also requires the prevention of any input of priority substances and limiting (or control) of the input of all other substances to groundwater to prevent the deterioration of status.

Regulation 19

1.2.9 Regulation 19 of the WFD regulations allows derogation from the aims of the WFD, this only applies to:

- New modifications to the physical characteristics of a surface water body that cause deterioration, or
- Alterations to the level of bodies of groundwater, or
- Deterioration from high to good status for surface water bodies related to new sustainable human development activities

1.2.10 Regulation 19 can be invoked if the applicant is able to demonstrate that the Project is:

- The reasons for the modifications or alterations, or for the sustainable development activities, are of overriding public interest;
- The benefits to the environment and to society of achieving the environmental objectives are outweighed by the benefits of the new modifications or alterations, or of the sustainable development activities, to human health, to the maintenance of human safety, or (in the case of modifications or alterations) to sustainable development; and,
- All practicable steps are taken to mitigate the adverse impact on the status of the body of water.

[6] *Environment Agency, 2016, WFD Groundwater Bodies Cycle 2*

1.3 Purpose of report

Aims

1.3.1 The aims of this document are to provide:

- background information on the proposed Project and the requirements of the WFD regulations;
- a high-level baseline understanding of the water bodies that would be affected by the proposed Project, within the context of the WFD;
- an assessment of the potential for the proposed Project to cause deterioration in the WFD status of any water body directly or indirectly; and
- an assessment of the potential impacts on water body improvement measures and the ability to meet WFD objectives.
- a plan to gather further evidence to address any uncertainties within this assessment.

Structure of report

1.3.2 The document is structured as follows:

- Introduction (Section 1)
- Project description (Section 0)
- Master Planning Process (Section 3)
- Methodology (Section 4)
- Stage 1 Screening (Section 5)
- Stage 2 Scoping (Section 6)
- Stage 3 Impact Assessment (Section 7)
- Conclusions and recommendations (Section 8)

1.4 Engagement

1.4.1 Details of engagement with the Environment Agency during Gate 3 development of this WFD Assessment for SESRO are presented in Table 1.1.

Table 1.1 Technical Liaison Group meetings relevant to the WFD assessment on SESRO

Date	Environmental Topic	Invitees	Attendees	Specific issues discussed relevant to WFD assessment
17/01/2024	SESRO & T2AT Aquatic Ecology Gate 3 Technical Liaison Group (TLG)	Natural England, Environment Agency	All	Introduction to WFD assessment and other environmental assessments and surveys
13/03/2024	SESRO & T2AT Aquatic Ecology Gate 3 TLG	National Appraisal Unit (NAU), Natural England, Environment Agency	All	Updated approach, monitoring programme and watercourse design

2. Project Description

2.1.1 The proposed Project would be a strategic water resource in the south-east of England to secure water supply for Thames Water, Affinity Water and Southern Water customers. It would comprise a new 150 million cubic metre (Mm^3) embankment reservoir (with a 650 hectare (ha) water surface area) in Oxfordshire, approximately 5 km to the southwest of the town of Abingdon-on-Thames.

2.1.2 In this report, the 'proposed Project' is used to describe the reservoir footprint and all the ancillary infrastructure associated with the reservoir which is outlined in more detail in Section 3. The 'reservoir footprint' is used to describe the footprint of the reservoir and the associated embankments. The 'Zone of Influence (ZoI)' is used to describe the potential spatial extent of the impacts of the proposed Project.

2.1.3 The proposed Project would abstract, and store water taken from the River Thames near Culham. Water would be taken from the River Thames during high flow periods and would be released back into the river during periods of low water flows in the River Thames or during periods of high demand for abstraction further downstream, thereby providing additional resilience during

drought conditions. To support the construction and operation of the reservoir the Project also incorporates access roads and diversion of an existing road, pipelines linking the reservoir to the River Thames with associated intake/outfall structures and emergency drawdown infrastructure, intake structures and pipelines to support transfers to Thames Water's Swindon and Oxfordshire (SWOX) water resource zone and a proposed transfer to Southern Water, temporary rail sidings for material imports, a new water treatment works (WTW), watercourse diversions, landscaping and habitat creation.

2.1.4 The proposed Project is part of a gated process for Strategic Resource Options (SROs) which is administered by RAPID, an organisation formed to help accelerate the development of new water infrastructure and design future regulatory frameworks.

2.1.5 The Project is currently at the Gate 3 development of design stage. Gate 3 details finalised feasibility, pre-planning investigations and planning applications. The WFD Assessment is specifically updated to aid detailed design and planning, focussing only on option 150 Mm^3.

2.1.6 Details for the Interim Landscape and Environment Master Plan for 150 Mm^3 option (Figure 2-1) and Master Plan zoning (Figure 2-2) is outlined in the SESRO Public Consultation 2024, Technical brochure June 2024.[7]

2.1.7 To mitigate impacts associated with channel loss under the reservoir footprint, SESRO requires the diversion of various watercourses including the Cow Common Brook (formerly known as the Western Watercourse Diversion (WWD) in Gate 2) and East Hanney Ditch, both to the west of the Project, and the Mere Dyke (formerly known as the Eastern Watercourse Diversion (EWD) in Gate 2), to the east of the Project. A small reach of the Landmead Ditch and River Ock will also be realigned/restored to improve the habitat value of each of these watercourses. These form the basis of all the realigned watercourses affected by the Project's footprint, as shown in Figure 2-1. The baseline water environment is detailed further in Section 5.2 and presented in Figure 5-4.

[7] *Thames Water, 2024, SESRO Public Consultation Technical brochure June 2024, Technical Annex A Conceptual Design Report.*

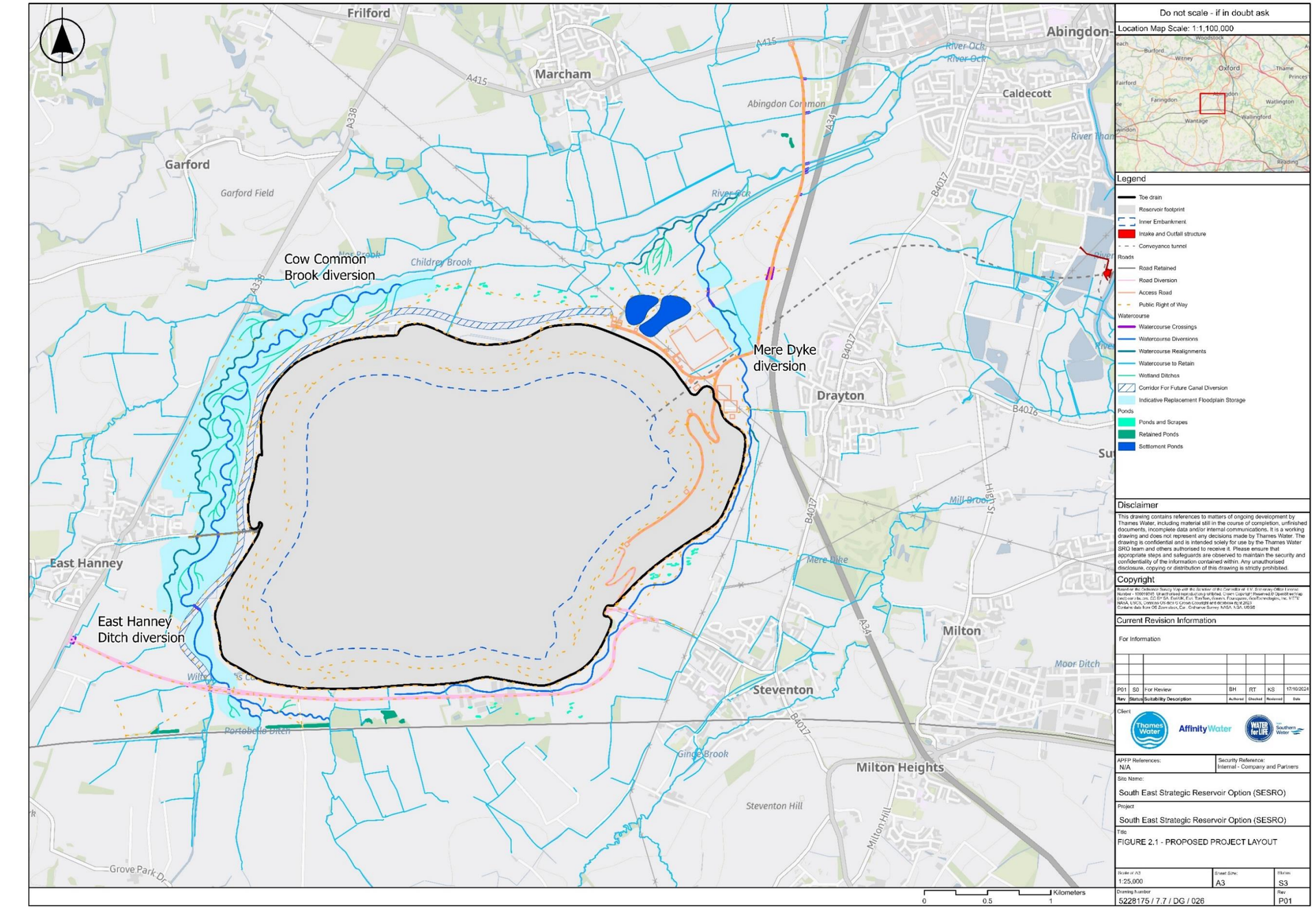

Figure 2-1 Proposed Project layout

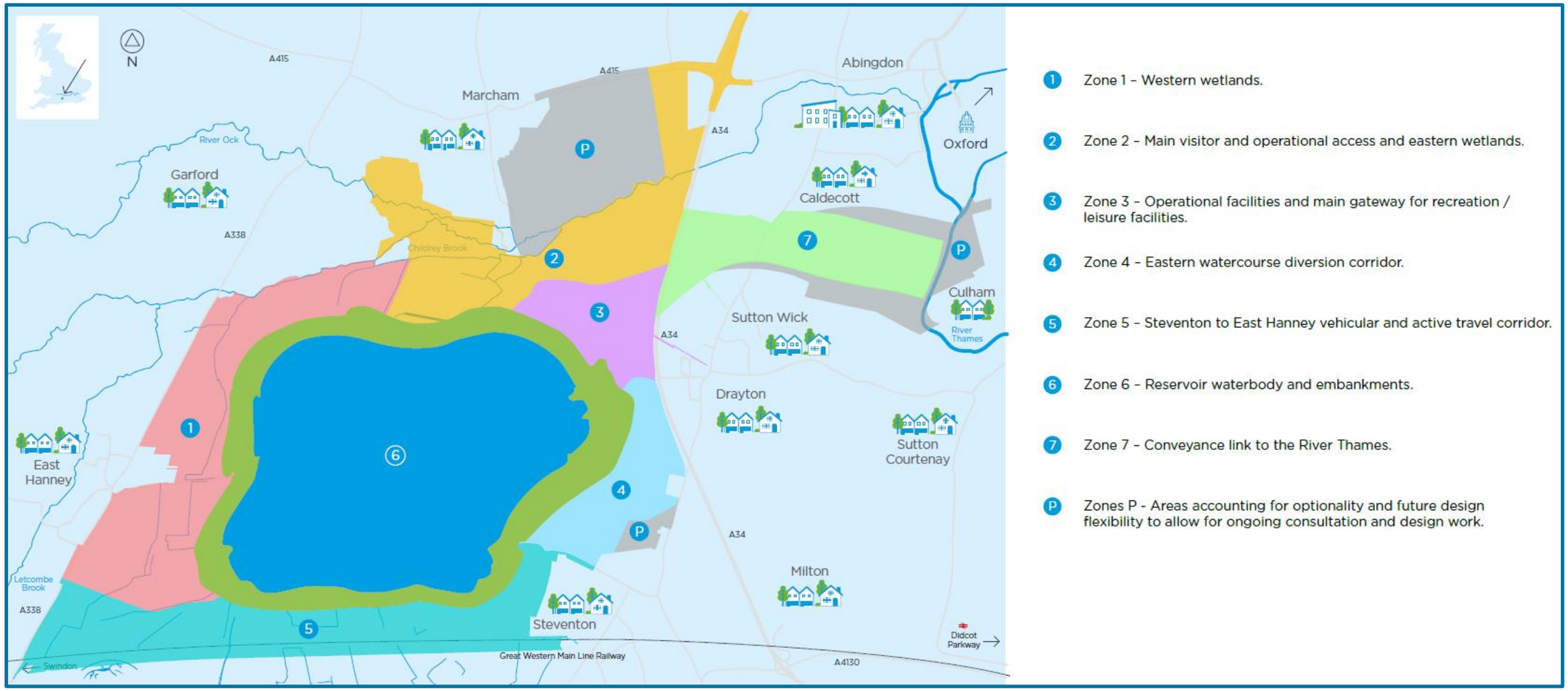

Figure 2-2 Zoning plan[8]

[8] *Thames Water, 2024, SESRO Public Consultation Technical brochure June 2024, Technical Annex A Conceptual Design Report, Chapter 3.*

3. Master planning process

3.1.1 An Interim Landscape and Environment Master Plan[9] has been developed for SESRO in Gate 3 which sets out how the technical elements of the reservoir infrastructure could be integrated within the local environment and include opportunities for public access and recreation. The design development has been informed by the Draft Design Principles for SESRO[10] and has incorporated embedded mitigation which is determined as an intrinsic part of the Project design. An Environmental Scoping Assessment has been submitted alongside the Interim Landscape and Environment Master Plan in 2024 which has not been updated to incorporate any further consultation and requirements which have come from the Scoping Opinion.

3.1.2 A number of options for associated infrastructure have been studied under the design development process and an Interim Landscape and Environmental Master Plan. The full options assessment process and results are reported in detail in the following documents, available as part of the non-statutory public consultation which was undertaken in the summer of 2024:

- Option Appraisal – Context and Methodology report[11]
- Option Appraisal – Rail Siding and materials handing area report[12]
- Option Appraisal – Access and diversion roads report[13]
- Option Appraisal – Connectivity to the River Thames report[14]
- Option Appraisal – Thames to Southern Transfer SRO, WTW site identification report[15]
- Interim Landscape and Environmental Master Plan[16]
- Draft Design Principles[10]

3.1.3 The Interim Landscape and Environment Master Plan is sub-divided into seven broad zones. The zones are illustrated on Figure 2-2, with a description of the

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[9] Thames Water, 2024, SESRO Interim Master Plan, June 2024
[10] Thames Water, 2024, SESRO Draft Design Principles, June 2024.
[11] Thames Water, 2024, SESRO Option Appraisal – Context and Methodology report, June 2024.
[12] Thames Water, 2024, SESRO Option Appraisal – Rail Siding and materials handing area report, June 2024.
[13] Thames Water, 2024, SESRO Option Appraisal – Access and diversion roads report, June 2024.
[14] Thames Water, 2024, SESRO Option Appraisal – Connectivity to the River Thames report, June 2024.
[15] Thames Water, 2024, SESRO Option Appraisal – Thames to Southern Transfer SRO, WTW site identification report, June 2024.
[16] Thames Water, 2024, SESRO Interim Master Plan, June 2024

indicative elements included in Table 3.1. The general layout of the Interim Masterplan is shown in Figure 2-1.

3.2 Embedded Mitigation

3.2.1 This Masterplan included embedded mitigation identified within the EIA Scoping assessment. This is detailed further in Section 6.5 but includes the Cow Common Brook, the East Hanney Ditch and the Mere Dyke diversions. It also includes the realignment of the River Ock and Landmead ditch and a new network of ditches and habitat enhancements designed to maximise habitat diversity.

3.3 Landscape and Environmental Masterplan

3.3.1 The zones as described in the SESRO Public Consultation 2024, Technical brochure June 2024[17] are summarised as follows:

- Zone 1 – Western wetlands
- Zone 2 – Main visitor and operational access and eastern wetlands
- Zone 3 – Operational facilities and main gateway for recreation / leisure facilities
- Zone 4 – Eastern watercourse diversion corridor
- Zone 5 – Steventon to East Hanney vehicular and active travel corridor
- Zone 6 – Reservoir water body and embankments
- Zone 7 – Conveyance link to the River Thames

3.3.2 The indicative elements in each zone are summarised in Table 3.1.

[17] *Thames Water, 2024, Public Consultation 2024, Technical brochure, Chapter 3, June 2024*

Table 3.1 Elements of the Project, listed by development zone

Zone	Key elements
Zone 1 – Western wetlands	• Watercourse diversion of Cow Common Brook, realignment of East Hanney Ditch and diversion of other ditches which lie within the reservoir footprint. • Replacement floodplain storage, hydraulically connected to the watercourses. • Western extent of Steventon to East Hanney road diversion, incorporating a segregated footway and cycleway • Minor car park • Corridor with provision to enable the potential future Wiltshire and Berkshire Canal • Recreational access via public rights of way (PRoW) or permissive paths • Landscape and biodiversity habitat proposals, such as wetland habitat mosaic, wet woodland, intermittent trees and shrubs, hedgerows, grasslands, wildlife ponds, scrapes and pools • Some land may be reinstated and returned to agriculture • Environmental bunding south of the road diversion • Works to utilities, such as diversions for gas and water mains
Zone 2 – Main visitor and operational access and eastern wetlands	• Main access road from the A415 Marcham Road for construction, visitor and operational access with new A415 roundabout as a rural-type two-lane carriageway with cycle/footpaths, including measures to cross the floodplain and River Ock • New WTW and all associated infrastructure, buried pipeline transfers, utility connections and operational access and parking facilities as required (optional WTW location also included in Zone 3) • Mere dyke watercourse diversion, diversion of associated ditches and realignment of the River Ock and Landmead Ditch • Replacement floodplain storage • Corridor with provision to enable the potential future Wiltshire and Berkshire Canal • Recreational access via PRoW or permissive paths • Landscape and biodiversity habitat proposals, such as wetland habitat mosaic, wet woodland, hedgerows, grasslands, wildlife ponds, scrapes and pools • Some land may be reinstated and returned to agriculture • SWOX raw water transfer buried pipeline transfer and connection chamber • Works to utilities, such as diversions for gas mains

Zone	Key elements
Zone P to west of zone 2	• Further space for main access road options that are being consulted on
Zone 3 – Operational facilities and main gateway for recreation / leisure facilities	• Continuation of the main access road from Zone 2, including measures to cross the eastern watercourse diversion • Pumping station to draw water through the conveyance tunnel from the river intake and pump it into the reservoir, anticipated to be partially buried with an above-ground control building • Discharge in the other direction from the reservoir would flow by gravity, via energy recovery turbines in the pumping station • Part of an underground reservoir conveyance tunnel (refer to Zone 7 for further information), transfer of water between the reservoir and the River Thames would be intermittent depending on river flows and water demand • Pumping station for SWOX raw water transfer to Farmoor Reservoir, with associated water infrastructure connections and operational car parking • Allowance for connections to STT, should this be required • New WTW, as for Zone 2 (optional WTW location also included in Zone 2) • Mere dyke watercourse diversion and diversion of associated ditches Replacement floodplain storage • Corridor with provision to enable the potential future Wiltshire and Berkshire Canal • Main visitor car park • Clear separation between publicly accessible and operational areas, such as a road junction off the main access road to control access
Zone 4 –Mere Dyke watercourse diversion corridor	• T2ST buried pipeline transfer • Eastern watercourse diversion, incorporating the proposed route of watercourses such as ditches that comprise the Mere Dyke system • Recreational access via PRoW or permissive paths • Landscape and biodiversity habitat proposals, such as wetland habitat mosaic, wet woodland, other woodland, intermittent trees and shrubs, scrub, hedgerows, grasslands, great crested newt (GCN) *Triturus cristatus* habitat ponds and other wildlife ponds, scrapes and pools • Some land may be reinstated and returned to agriculture • Environmental bunding to the north-west of Steventon and along the A34

Zone	Key elements
	• Space for Steventon to East Hanney road diversion options that are being consulted on.
Zone 5 – Steventon to East Hanney vehicular and active travel corridor	• Steventon to East Hanney road diversion as a rural-type two-lane carriageway with footpaths or cycle/footpath, including crossings of the Cow Common Brook watercourse diversion, potentially providing secondary construction access • Minor car park • Origin of Cow Common Brook and Mere Dyke watercourse diversions, incorporating a variety of ditches • Replacement floodplain storage • Recreational access via PRoW or permissive paths • Landscape and biodiversity habitat proposals, such as wetland habitat mosaic, wet woodland, other woodland, intermittent trees and shrubs, hedgerows, grasslands, GCN habitat ponds and other wildlife ponds, scrapes and pools • Environmental bunding west of Steventon • Temporary rail siding and materials handling area (RSMH) during construction to facilitate delivery of certain construction materials by freight train, with material storage • T2ST buried pipeline transfer and connection chamber • Works to utilities, such as diversion of an existing overhead powerline, diversion or reinforcement for gas main and removal and diversion of water mains.
Zone 6 – Reservoir water body and embankments	• Creation of a reservoir through excavation of clay from a central 'borrow pit' and building this clay into embankments above ground level at the edge of the pit, aiming for an earthworks 'cut and fill' balance on site minimising materials import and export • Reservoir will be designed, constructed and operated in full compliance with the Reservoirs Act 1975 (as amended) • Reservoir water body, with a surface area approximately 6.5 km^2 and up to approximately 35 m depth in the deepest part at full capacity • 'Live' (usable) water storage of 150 Mm^3 plus a suitable allowance for 'dead' (not suitable for use) storage at the base of the central borrow pit trench • Reservoir embankment with indicative height of between *c*.15 m (south) and *c*.25 m (north) relative to existing ground levels. Ground levels slope gently downwards from south of the site to the north of the site. • Topsoil, subsoil and overburden excavated from within the zone and the excavation of the conveyance tunnel to the River Thames would be used as landscape fill. This would provide a layer on top of the structural embankment clay fill,

Zone	Key elements
	allowing the outer slope and crest to be varied and enabling planting and the creation of facilities for recreation • Maintenance access track and permissive path on the embankment crest • Water inlet and outlet arrangements, currently envisaged to be towers with an indicative height of up to 18 m above the embankment, connected with a culvert/ conveyance tunnel to enable water to be discharged into the reservoir and extracted from it (refer to Zone 7 for further information) • Facilities to enable the water level to be drawn down during an emergency in line with requirements of the Reservoirs Act 1975 such as siphon pipes or similar, buried below the surface of the reservoir embankment • Internal edges of the reservoir to be provided with appropriate wave and erosion protection, supplemented as required by wave walls and access features such as steps or ramps in some sections • Reservoir embankment drainage, including internal drainage system and embankment toe drain, the latter of which would prevent unauthorised vehicular access onto the embankment • A system to supplement the circulation and mixing of water, such as an air diffuser network or a recirculation pumping system, or a combination of these, would be included to maintain good water quality and minimise algae growth • Recreational facilities, visitor and/or public education facilities with associated access and parking, such as water sports facilities and café • Recreational access via PRoW or permissive paths, including diversion of existing PRoW • Landscape and biodiversity habitat proposals, such as floating islands, wetland lagoons, pasture for sheep grazing, woodland belts and copses and hedgerows
Zone 7 – Conveyance link to the River Thames	• Combined intake/outfall structure located on either the right (west) or left (east) bank of the River Thames near Culham, anticipated to include intake screens, an outfall weir, control building and associated access • Within the river, protection measures to protect the intake structure and screens from collision with watercraft • Underground conveyance tunnel to move water between the River Thames and SESRO in both normal operation and for drawdown of the reservoir in an emergency, travelling under the river (for left bank options) and under the A34, excavated by a tunnel boring machine (TBM)

Zone	Key elements
	• Potential realignment of the existing outfall from the Abingdon STW, as required to help manage water quality at the SESRO intake • Landscape and biodiversity habitat proposals, such as intermittent trees, shrubs and grasslands • Potential permanent diversion of the existing PRoW (including the Thames Path National Trail) and/or National Cycle Network (NCN) Route 5 around the intake/outfall structure • Works to utilities, such as diversion or reinforcement for a gas main and wastewater pipe with potential connection to the existing Thames Water sewerage network • Wastewater pipe from new WTW to Abingdon STW
Zones P – to the north, east and south of Zone 7	• Space for conveyance tunnel and intake/outfall structure options that are being consulted on.

4. Methodology

4.1 WFD objectives

4.1.1 There are three key objectives against which the impacts of proposed works on a water body need to be assessed to determine compliance with the overarching objectives of the WFD:

- Test A: The proposed Project will not cause a deterioration in any element of water body classification;
- Test B: The proposed Project will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies; and,
- Test C: The proposed Project will contribute to the delivery of the relevant WFD objectives. In case of SESRO, what contribution it makes towards the planned RBMP PoM required to support the water body reaching its objective of GES.

4.1.2 The first two obligations must be met to avoid infraction of the WFD and set out the fundamental WFD Assessment Objectives that have been assessed as a 'test of constraint' for SESRO option 150 Mm^3. The delivery of the third objective is central to the EA's implementation of the WFD, where it can be supported through its operational activities.

4.1.3 There are a number of further WFD Assessment Objectives, set out in the Water Resource Planning Guidelines (WRPG), which are outlined below. These are considered as progressive WFD Assessment Objectives rather than tests of constraint and do not lead to WFD non-compliance if not achieved. These are as follows:

- To assist the attainment of the WFD Objectives for the water body – in line with Regulation 13(2)(b),13(2)(c), 13(5)(a) and 13(5)(b);
- To assist the attainment of the objectives for associated WFD protected areas – in line with Regulation 13(6); and,
- To reduce the treatment needed to produce drinking water and look to work in partnership with others; promoting the requirements of Article 7 of the WFD.

4.2 Planning Inspectorate (PINS) WFD assessment methodology

4.2.1 Although the Project is currently at Gate 3 which is undertaken prior to planning investigations and planning application, it is understood that the Project will be designated as a NSIP and therefore would be required to go through the DCO process. WFD compliance is assessed in respect of the process set out in The Planning Inspectorate (PINS) Advice on the Water Framework Directive. (PINS, 2024)[2]. The guidance suggests that a WFD compliance assessment be comprised of three key components:

- Stage 1 Screening assessment – to determine what activities associated with the Proposed Development require further consideration and what activities can be screened out at this stage of the process for example activities which have been ongoing since before the current River Basin Management Plan cycle so form part of the baseline;
- Stage 2 Scoping assessment – to identify risks of the Proposed Development activities to receptors based on relevant water bodies and their water Quality Elements; and,
- Stage 3 Impact assessment – a detailed impact assessment of the water bodies and their Quality Elements that are considered to likely be affected by the proposed Project. Any potential issue for non-compliance would be highlighted at this stage along with consideration of mitigation measures and enhancements that would contribute to WFD and RBMP objectives.

4.2.2 Further details of these components are set out in the sections below.

4.2.3 At the current stage (Gate 3), the assessment is set out to align with the PINS guidance for WFD assessments[2] and is refined to support the DCO process. An illustration of the gated process is shown in Figure 4-1. It is worth noting that the proposed Project is still early in the development process and thus it is expected that the design and any associated mitigation requirements will be further developed over time.

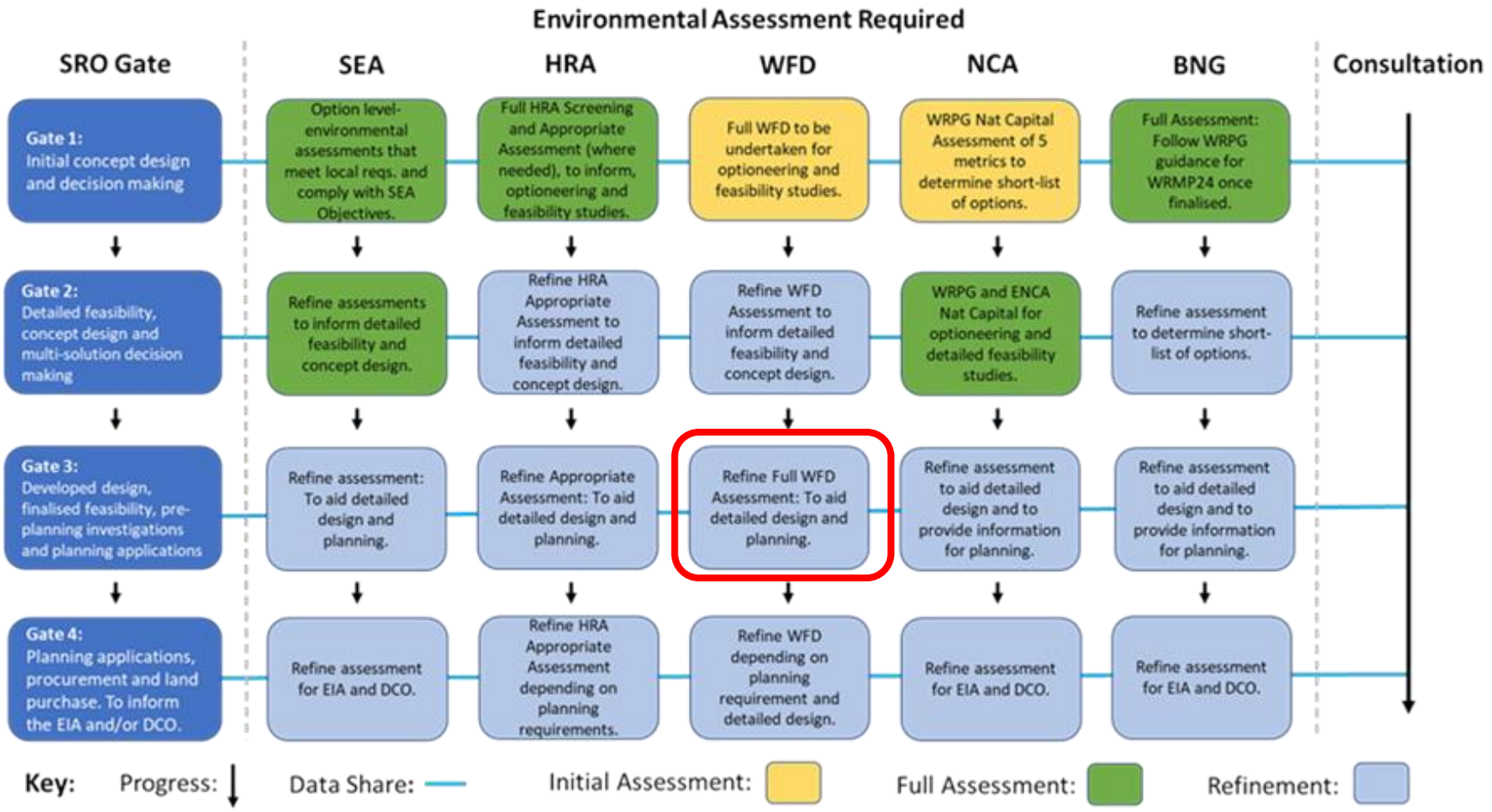

Figure 4-1 ACWG – Levels of assessments required for each SRO Gate

4.3 Stage 1 Screening Methodology

Stage 1 Screening of surface water bodies

4.3.1 The method used for the Stage 1 screening assessment identifies any water bodies that have the potential to be impacted by the proposed Project. For this assessment, any surface water body likely to be impacted by any part of the reservoir or associated works was included in the assessment, as well as any river water body downstream of the intake outfall structure until the tidally influenced part of the Thames at Teddington where it is assumed that flows released by SESRO will have been re-abstracted. The name, ID and type of water body are included.

Stage 1 Screening of groundwater bodies

4.3.2 The method used for the Stage 1 screening assessment identifies any WFD groundwater bodies that have the potential to be impacted by the reservoir footprint and its associated infrastructure. Where there is no pathway for impacts to WFD groundwater bodies, these have been screened out of further assessment.

4.4 Stage 2 Scoping Methodology

4.4.1 The Stage 2 scoping is based on the baseline characteristics of each WFD water body identified through a desk-based study using Catchment Data Explorer[18] (Environment Agency, 2024) and the RBMP. This includes identification of watercourses within each water body, the current classification status (2019 and 2022, Cycle 3) for all water Quality Elements, the pressures affecting the water bodies, and its sensitivity to change.

4.4.2 Field surveys were undertaken by experienced specialists within the footprint of the reservoir where access was permitted. Assessments were made to characterise (e.g. the form and processes) the receptors within the surface water bodies potentially affected by the Project, as identified in the Stage 1 screening assessment.

4.4.3 Fluvial geomorphology walkovers surveys and MoRPh surveys have been completed along accessible areas along Cow Common Brook, Portobello Ditch and Mere Dyke. The fluvial geomorphology surveys were completed by an experienced fluvial geomorphologist and the MoRPh surveys were completed by an accredited MoRPh surveyor. The MoRPh surveys were used specifically

[18] *Environment Agency, 2024, Catchment Data Explorer, https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/6.*

to inform the Biodiversity Net Gain (BNG) assessment[19] but both have been used to support the characterisation of water bodies in this WFD assessment.

4.4.4 An assessment identified the mechanisms of impact from the Project to the surface water receptors of the relevant water bodies as identified during the Stage 1 Screening. The mechanisms of impact which have been considered are presented in Table 4.1.[20]

4.4.5 Project activities were scoped in and out based on the mechanisms of impact identified and the low-risk categories in the Environment Agency position statement 488_10.[21]

[19] *South East Strategic Reservoir Option (SESRO), Gate 3 Biodiversity Net Gain Assessment, October 2024. J696-AJ-A02X-ZZZZ-RP-EN-100040.*
[20] *As no groundwater bodies were screened into the assessment, this section focusses on surface water impacts alone.*
[21] *Environment Agency, 2010, Assessing new modification for compliance with WFD: detailed supplementary guidance, supplementary guidance 488_10_SD-1. Section: Water Framework Directive compliance of physical works in rivers Screening step 1.3: WFD deterioration & risk to water body status objectives*

Table 4.1 Mechanisms of impact to surface water bodies

Mechanism of impact	Description	Element impacted				
		Biological	Physio chemical	Specific pollutants	Hydromorphological	Chemical
Direct loss or alterations to open channel	Any direct loss of watercourse, ditch or floodplain habitat. This could be from new culverts, new abstraction or augmentation infrastructure, reservoir footprint, reduced vegetation coverage or installation of hard bed or bank protection which will have a significant impact on the receptor.	✓			✓	
Shading	Loss of light from the channel which is not associated with direct loss of habitat.	✓	✓		✓	
Changes in flow volumes	Changes in the quantity in the watercourses or associated wetland habitats due to any alterations in augmentation or abstractions.	✓	✓	✓	✓	✓
Changes in water quality out falling to the receptor	Alterations to the quality of water out falling to the watercourse or associated wetland habitats as a result in increased or decreased pollution, changes in catchment flow dynamics or new abstractions or outfalls.	✓	✓	✓		✓

Mechanism of impact	Description	Element impacted				
		Biological	Physio chemical	Specific pollutants	Hydromorphological	Chemical
Creation of new habitats	Any additional habitat creation as part of the Project. For example, creation or new ditch length or wetland features on the floodplain or improvements.	✓				
Enhancement of existing habitats	Any additional habitat enhancement as part of the Project. For example, enhancements of watercourses, ditches or existing wetland habitats.	✓	✓	✓	✓	✓
Changes in surface water quality due to below ground structures	Alterations to the quality of water within surface water bodies as a result of a below ground structure. This could include a new pathway for contamination (e.g. piling) or introduction of a new source of pollution.	✓	✓	✓		✓
Changes in surface water quantity due to below ground structures	Changes in surface water quantity as a result of new below ground structures. This could result from below ground structures such as sheet piling or earthworks.	✓	✓	✓	✓	✓

4.5 Stage 3 Impact Assessment Methodology

4.5.1 Once the proposed Development activities and their associated risk to Quality Elements have been appropriately Scoped in and out, an impact assessment is undertaken to determine the potential impacts on the water body elements, and the Mitigation Measures and future attainment of objectives associated with the water body.

4.5.2 A "Red, Amber, Yellow, Green, Blue" (RAYGB) code system was used in a risk-based approach (as outlined in Table 4.2). Definitions for the colour coding were assigned to indicate the level of risk of objective non-compliance within each water body, accounting for mitigation already "embedded" into the preliminary design (as summarised in Section 6.5 of this document) and for the additional mitigation to be integrated into later phases of the design. It should be noted that, as no groundwater bodies were scoped into the assessment, this methodology is focused on surface water body impacts alone.

4.5.3 To support the assessment of WFD compliance during operation of SESRO, a 1D Infoworks model of the River Thames was developed (also see Section 7.2). The 1D Infoworks model provided an assessment of the potential changes in flow velocity, level and water quality (Ammoniacal Nitrogen, Nitrite, Nitrate, Total Phosphorus, Silicate, BOD, Dissolved Oxygen, Suspended Solids and Algae). The magnitude of change, as determined by the modelling, was used to inform the risk to WFD compliance. This 1D Infoworks was informed by the potential changes in the flow regime of the River Thames by considering outputs from a PyWR water resource model. Three model scenarios simulated with climate change perturbations were run for the reservoir models and the River Ock modelling. The simulation also included model runs without climate change perturbation to allow comparison with current conditions (i.e. the current baseline without SESRO operational and without climate change).

Aquatic Ecology

4.5.4 The potential changes in flow regime were also used to inform the risk of non-compliance with the Ecological Flow Indicator (EFI) as a result of construction (i.e. changes in catchment size in the Ock Catchment) and operation (abstraction and releases in the River Thames). The Environment Agency uses the EFI to indicate where abstraction, or flow regulation, may start to have an undesirable impact on river habitats and species. The EFI is determined by considering the natural Q_{95} flows at the outflow of a water body (or an identified Assessment Point) and the perceived sensitivity of the water body to flow changes as expressed by the Abstraction Sensitivity Band (ASB). ASBs range from 1 (water body has a low sensitivity to flow change) to 3 (water body very sensitive to flow changes) to determine the extent to which observed flows can differ from naturalised flows. The ASBs are informed by the sensitivity of the fish and macroinvertebrate communities as well as the watercourse habitat (as informed by macrophyte data). The Environment Agency collates these data in

a tool known as the Water Resources GIS (WRGIS) to assist with the management of abstractions.

4.5.5 The assessment of the potential impact on the flow regime of the River Thames was undertaken in consideration of the proposed Hands-off Flow (HoF). A HoF is a licence condition which constrains or stops abstraction when flows in a river reach a certain level. In the case of SESRO, the abstraction will be controlled by a dual Hands-off Flow (HoF), meaning that the flows in the River Thames will be considered at two locations when determining whether abstraction can occur. For SESRO only flows that are in excess of 1,450 Ml/d at Sutton Courtenay (Q50 as calculated at Gate 1) and 2,834 Ml/d (based on a 5 day average flow) at Kingston can be abstracted into SESRO. The dual HoF therefore protects the lower flows in the River Thames from abstraction. Releases are made from SESRO to augment low flows and can only occur when SESRO is not abstracting.

4.5.6 While classification of the Hydromorphology Quality Elements is informed by compliance with the EFI, the Hydromorphology Quality Elements also requires an assessment of the quantity and dynamics of water flow. As such, the potential flow regime changes were considered for the full flow regime (not only low flows) through the identification of elements of the flow regime that are considered important for providing the ecological requirements of the aquatic features in the River Thames.

4.5.7 In addition to the potential water quality changes (as informed by the 1D Infoworks), the potential impacts on water quality and Biological Quality Elements were also considered via inputs of algae to the river which were derived from the PROTECH reservoir model run by Centre of Ecology and Hydrology (CEH), temperature inputs were based on Computational Fluid Dynamics (CFD) reservoir modelling (run by Tuan Ta Limited) and inputs of other chemicals were output from the Intermediate Reservoir Water Quality model, developed by AtkinsRéalis.

4.5.8 In the 1D hydrodynamic element of the River Thames Infoworks ICM model developed for SESRO, river cross sections were split into “panels” for which values of depth, wetted area, volumetric flow rate or velocity were extracted to present 2D outputs. River cross sections were identified in consultation with the Environment Agency to select sections that are representative of ecologically important habitats. This included weir pool habitats near Clifton, Days and Culhams locks.

4.5.9 To assess the risk to the Biological Quality Elements, the potential changes in the flow regime, velocity, level, and water quality were considered in the context of the current WFD classification and baseline sensitivity of the aquatic ecology features. The baseline sensitivity was established by considering multiple data sources including data presented by the Environment Agency and data collected through a targeted survey programme developed for SESRO. Broadly, two types of data were used to build an understanding of the baseline

aquatic ecology, including community and population sensitivities across the study area. This included community biological metrics (including those metrics used to inform WFD classification) and species records.

4.5.10 Data on the location and design of the proposed intake, existing intakes and existing fish passes were also considered to inform the risk of entrainment/impingement and connectivity as part of the compliance assessment for the fish Biological Quality Element. This assessment was also informed by data on the distribution of juvenile and larval fish as collected through the targeted survey programme for SESRO

Water Quality Model development

River Thames

4.5.11 WFD compliance was assessed through an 1D Infoworks model of the River Thames covering hydrology, level and water quality (Ammoniacal Nitrogen, Nitrite, Nitrate, Total Phosphorus, Silicate, BOD, Dissolved Oxygen, Suspended Solids and Algae). Inputs of algae to the river were derived from the PROTECH reservoir model run by Centre of Ecology and Hydrology (CEH), temperature inputs were based on Computational Fluid Dynamics (CFD) reservoir modelling (run by Tuan Ta Limited) and inputs of other chemicals were output from the Intermediate Reservoir Water Quality model, developed by AtkinsRéalis. All these models use selected time series inflows and outflows, to and from SESRO, from the Pywr water resources model. Three model scenarios simulated with climate change perturbations were run for the reservoir models and the River Ock modelling. The simulation also included model runs without climate change perturbation to allow comparison with current conditions (i.e. the current baseline without SESRO operational and without climate change). These scenarios were selected to test a range of conditions primarily focused on conditions within the reservoir and potential impacts on the receiving River Thames. The three scenarios covered;

- A severe 4 year drought event with notable reservoir drawdown, a short period of spring refill to the reservoir, followed by continued drawdown;
- An extreme 4 year drought scenario that simulates continued drawdown with no spring refill; and,
- A 2 year scenario that represents the most frequent operation of SESRO, therefore the least severe hydrological conditions of all three scenarios.

4.5.12 As the results of the reservoir modelling indicated very little difference between the two, 4 year droughts, only the 4 year drought with the spring refill was simulated for the full extent of the River Thames model along with the most frequent operating conditions for SESRO. Both scenarios were based on stochastic hydrology time series, modelled in Pywr and represent future climate change conditions in 2045.

4.5.13 The models used a number of key assumptions.

- SESRO has a storage of 150 Mm^3 and has a maximum augmentation to the River Thames at Culham of 321 Ml/d.
- A lower operational release of 77 Ml/d is however proposed when SESRO will first be operational along with all receiving companies operational at the same time (estimated to be in 2045).
- The simulated augmentation was reduced by 2% before it is input to the River Thames to account for potential losses along the river itself.

4.5.14 The timing of the releases from SESRO were determined by Pywr and were all triggered at Drought Event Level 1 (DEL1). This occurs when either London reservoir storage as represented in the Pywr model falls below Level 1 of the Lower Thames Control Diagram (LTCD) and flows on the River Thames at Teddington fall below 3,000 Ml/d, as a 10-day rolling average.

4.5.15 Changes in depth along the River Thames as a result of the triggered releases from SESRO have been simulated in the 1D Infoworks model. This shows a small difference in head of less than 10cm during the SESRO release period during the 4 year drought scenario with the difference decreasing downstream. At some flows the level change can decrease as well as increase due to how the structures respond to the flow change. The modelling work in Gate 3 has improved representation of the influences of control structures on head compared to Gate 2 and as a result, the modelling suggests that there is less impact than was thought to be the case previously. However, the modelling continues to not take account of full details of all local operating procedures, which will need continual validation during subsequent project stages.

River Ock and tributaries

4.5.16 In Gate 2, SAGIS SIMCAT was used to model changes in flow in water in the River Ock catchment. In Gate 3, the 1D Infoworks model of the River Thames was extended to include the Ock catchment to include all of the watercourse diversions proposed within the SESRO ZoI (i.e. in the Cow Common Brook, East Hanney Ditch and Mere Dyke Diversions). The model was extended upstream of the A338 to the western part of SESRO to include the discharge of Wantage Sewage Treatment Works into the Letcombe Brook and the lower Childrey Brook. Downstream of SESRO the model has been extended down to the confluence with the River Thames. The River Ock 1D hydrodynamic model includes the same chemical substances as the River Thames model.

4.5.17 Key changes to the River Ock, associated with SESRO are the replacement of part of the Cow Common Brook and Mere Dyke catchments with the open water the reservoir, along with the new reservoir embankment, and the routing of the pre-existing channels of the Cow Common Brook into new river channel diversions to the west of the reservoir. Removing part of the catchment by the reservoir footprint removes flow and chemical loads in roughly equal measure, so changes in water quality will be mainly related to residence times and depth in the channels.

4.5.18 Comparison of modelled river water quality was made before and after the development of SESRO in channels that will continue to exist once the reservoir is developed; namely at the bottom of the new Cow Common Brook, at the bottom of the Childrey Brook upstream of the confluence with the River Ock, the bottom of the East Hanney Ditch prior to confluence with the Childrey Brook and the bottom of the River Ock prior to the confluence with the River Thames.

4.5.19 It should be noted that the Ock model has been ran with a relatively limited amount of pre-existing water quality data. The water quality modelling was carried out when land access issues had resulted in only limited new water quality monitoring data becoming available. Older datasets were therefore relied upon (Environment Agency monitoring: Cow Common Brook, up to 2017; River Ock and Childrey Brook up to 2023).

4.5.20 When undertaking the River Ock modelling, all three scenarios along with each scenario's baseline are predicting some extremely low flows particularly in the upper drains and channels. This caused some modelling stability issues. Sweetening flows were added to the model to allow the model to run more stable during the three selected lower flow scenarios. Whilst all scenarios have been modelled, the assessment has also focused on the least severe scenario under which SESRO would be most frequently operated along with the corresponding baseline (i.e. the scenario with the higher simulated flows) and with greater reliance placed on results lower in the catchment as flows accumulate and model stability increases. This scenario/baseline has also been simulated and assessed in the River Thames modelling along with the severe four-year drought.

4.5.21 Changes in land-use beyond the open reservoir water footprint in the wider catchment were not taken into account in the modelling since these changes are not known at this stage (modelling of this would also require additional modelling to create inputs to the Infoworks model). However, intensive agriculture is likely to north of the railway line which should reduce diffuse pollution and thereby result in further improvements in water quality. Engagement with catchment land managers upstream of SESRO could be undertaken to assess the potential of joined up actions upstream to reduce land-use intensification but the project could not rely on any of this work being undertaken so is not part of the commitments of this proposed Project.

Table 4.2 Definitions of the colour coding system used to determine impacts

Type of impact	Impact of Project activity on WFD element e.g. impact of Creation of new habitats on Fish	Impact of the Project on WFD element e.g. overall impact of the Project on Fish	Impact on WFD water body i.e. the combined impact on the water body as a result of all the impacts on WFD elements	Outcome
Moderate Beneficial	Impacts when taken on their own have the potential to lead to significant improvement and achievement of WFD objectives.	Impacts in combination with others have the potential to lead to the improvement in the class of a WFD element and/or achieving WFD objectives.	Impacts in combination with others have the potential to lead to the improvement in the WFD status of the water body.	Increase in status class for that water body
Minor / localised beneficial	Impacts when taken on their own have the potential to lead to a minor localised or temporary improvement and work towards achieving WFD objectives.	Impacts in combination with others have the potential to lead to a minor localised improvement of the WFD element and work towards achieving WFD objectives.	Impacts in combination with others have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the water body.	Localised improvement, no change in status of WFD water body.
Green (no impact)	No measurable change to any Quality Elements.	No measurable change to any Quality Elements.	No measurable change to the status of the water body.	No change
Yellow – Localised/ temporary adverse impact	Impacts when taken on their own have the potential to lead to a minor localised or impact but no effect on the achievement of WFD objectives.	Impacts in combination with others have the potential to lead to a minor localised or temporary impact on the WFD elements but no effect on achievement of WFD objectives.	Impacts in combination with others have the potential to lead to a minor localised or temporary impact on the WFD water body status. Consideration will be given to habitat creation measures.	No change in status of WFD water body when balanced against mitigation embedded in the Project.
Amber – adverse widespread or prolonged impact	Impacts when taken on their own have the potential to lead to a widespread or prolonged impact and potential to prevent WFD objectives. Consideration will be given to habitat creation measures.	Impacts in combination with others have the potential to have an adverse impact on the WFD element and potential to prevent WFD objectives. Additional mitigation will be applied.	Impacts in combination with others have the potential to have an adverse impact on the WFD water body. The current WFD risk category will be taken into account when assessing these combined impacts. Consideration will be given to habitat creation measures.	Adverse impact but risk of status change needs to be considered with any additional mitigation and taking into account the level of confidence.
Red – adverse impact on an individual quality element and/or overall status of water body	Impacts when taken on their own have the potential to lead to a widespread or prolonged impact and/or prevention of WFD	Impacts in combination with others have the potential to have an adverse impact on the WFD element and change its class and/or prevent WFD objectives.	Impacts in combination with others have the potential to have an adverse impact on the WFD water body and change its status. The current WFD risk category will be taken into account when	Decrease in status of WFD water body when balanced against additional mitigation. .

Type of impact	Impact of Project activity on WFD element e.g. impact of Creation of new habitats on Fish	Impact of the Project on WFD element e.g. overall impact of the Project on Fish	Impact on WFD water body i.e. the combined impact on the water body as a result of all the impacts on WFD elements	Outcome
	objectives even with mitigation in place.	Consideration will be given to habitat creation measures.	assessing these combined impacts. Consideration will be given to habitat creation measures.	

4.6 Evidence and design confidence

4.6.1 Table 4.3 outlines all the evidence which has been used to support this assessment. This includes design information, survey and modelling. Each evidence type has been assigned one of three confidence categories based on the descriptions below:

- Low – Limited data and evidence available, based mainly or completely on expert judgement with many assumptions. Preliminary design information only, detailed information on location/routes, construction methods etc not yet available.
- Medium – Some data and evidence available, based partially on expert judgement with some assumptions. Design progressed but some assumptions made on construction methods etc.
- High – Lots of good data and evidence available. Design advanced minimal assumptions needed.

Table 4.3 Evidence used to support the assessment and associated confidence

Evidence	Data/design information	Confidence Rating
Concept Design/Masterplan	Interim Landscape and Environment Masterplan	Medium
Optioneering reports	Option Appraisal – Context and Methodology report Option Appraisal – Rail Siding and materials handing area report Option Appraisal – Access and diversion roads report Option Appraisal – Connectivity to the River Thames report Option Appraisal – Thames to Southern Transfer SRO, WTW site identification report	Medium
Design principles	Draft Design Principles	Medium
Environmental Management Plans	Not developed at this stage	N/A
MoRPh Survey	Around 32 of 73 planned surveys have been completed in the summer of 2024 within the footprint of the Project. Land access has hampered further data collection. MoRPh surveys were completed between Monday 17 June and Wednesday 19 June 2024 and previous visits were undertaken in November 2021. Further surveys will be undertaken when land access is granted.	Medium
Hydromorphology	Fluvial geomorphology surveys were conducted across the site between Monday 17 June and Wednesday 19 June 2024. This extended across Cow Common Brook, Portobello Ditch and Mere Dyke. Land access precluded a full survey which included no access on East Hanney Ditch.	Medium

Evidence	Data/design information	Confidence Rating
Aquatic Survey – River Ock and tributaries	Environment Agency data are available at survey locations across the River Ock and its tributaries, providing a baseline understanding of the biological elements. Macroinvertebrate and macrophyte data are available for all identified water bodies. Fish and diatom data is limited. Limited proposed Project data are available at the time of writing given access constraints during 2023 and 2024. Environmental DNA data at public access points has been collected since 2020 to support within infilling this data gap. Conventional survey macroinvertebrate data are also now available for a small number of survey locations (~10) for spring 2024.	Medium
Aquatic Survey – Thames	Environment Agency data are available for numerous survey locations on the River Thames to provide a baseline understanding of the biological elements. Targeted surveys for selected elements (e.g. juvenile fish) have also been completed in 2023 and 2024.	Medium – High
Water quality monitoring – River Ock and tributaries	Modelling has been undertaken for the River Ock and tributaries but there has been no data collected (due to land access restrictions) at sub-catchment level to validate water hydrology and subsequent water quality within the sub-catchments. Existing data from the Environment Agency is dated. However, the overall conclusion (i.e. that the Cow Common Brook and Childrey Brook catchments are unlikely to be at 'good' status) can be attributed medium to high confidence.	Low-Medium
Hydrodynamic (flow, level, water quality) modelling in the River Thames	Detailed modelling has been updated in Gate 3 using Infoworks ICM and results have showed limited change and hence confidence is improving in the outputs.	Medium
Hydrodynamic modelling (flow,	Detailed modelling has been undertaken for the River Ock and tributaries using InfoWorks ICM but	Low-Medium

Evidence	Data/design information	Confidence Rating
level, water quality) in the River Ock and tributaries	there has been no data collected (due to land access restrictions) at sub-catchment level to validate water hydrology within the sub-catchments.	
Hydrological modelling – Thames	Modelling has been updated in Gate 3 following a process of model improvements. Results have showed limited change from Gate 2 and hence confidence in the outputs is good.	Medium-High

5. Stage 1 Screening Assessment

5.1 Introduction

5.1.1 This section outlines the WFD water bodies which have the potential to be impacted by the proposed Project. The temporal scope of the proposed Project will consist of:

- Existing conditions of the proposed site and the surrounding areas (the existing baseline)
- Proposed Construction Phase (c. 2030 to 2040)
- Operation (opening year assumed in c. 2040, with maintenance in perpetuity)
- No future decommissioning (operated indefinitely)

5.1.2 The Project is proposed to form a long-term solution to ensure a secure and sustainable future water supply for the south-east. Although some elements of the Project would have a defined design life, it is proposed that all elements would be subject to continued maintenance / replacement in line with the management of the reservoir as a whole. Therefore, the proposed Project, once operational, would form part of a permanent reservoir and no activities are proposed that would require decommissioning or associated decommissioning plans. It is, therefore, proposed to screen decommissioning out of this WFD assessment.

5.2 WFD surface water bodies

5.2.1 The proposed location of the works lies within the Thames River Basin District, which is covered by the Thames River Basin Management Plan.[22] The main site is within the Gloucestershire and the Vale Management Catchment and the Ock Operational Catchment. However, as the volume of water in the River Thames may be altered, due to abstraction to, and augmentation from, the reservoir, water bodies on the River Thames need to be considered, from the nearby Evenlode to Thame WFD water body as far as the tidal limit (Teddington Weir). These water bodies are in the South Chilterns and Lower Thames Operational Catchments, and Thames and South Chilterns and Maidenhead and Sunbury Management Catchments. These operational catchments are illustrated in Figure 5-1 and potential water bodies impacted by proposed Project in Figure 5-2.

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[22] *Environment Agency, 2015, Part 1 Thames river basin district, River basin management plan. [online] Available at: Thames_RBD_Part_1_river_basin_management_plan.pdf (publishing.service.gov.uk) [Accessed June, 2024]*

5.2.2 The footprint of the proposed Project interacts with the catchments of six WFD surface water bodies in the River Ock Operational Catchment. Figure 5-3 shows a more detailed view of the area around the Project and illustrates the WFD surface water bodies affected by the footprint of the reservoir. The position of these watercourses is shown in Figure 5-4. These are labelled with their names where known. The watercourses include many ditches that follow field boundaries, some of these are previously straightened channels and flow pathways, others are completely man-made amendments to assist land drainage. There are also several Main Rivers.

5.2.3 The six WFD water bodies in the Ock catchment are:

- Childrey Brook and Norbrook at Common Barn (GB106039023380);
- Sandford Brook (Source to Ock) (GB106039023410);
- Cow Common Brook and Portobello Ditch (GB106039023360);
- Ginge Brook and Mill Brook (GB106039023660);
- Ock and tributaries (Land Brook confluence to Thames) (GB106039023430); and,
- Thames (Evenlode to Thame) (GB106039030334).

5.2.4 Previous hydrological modelling work by Thames Water (2007) assessed that the main zone of hydrological influence is the reach of the River Thames between the proposed SESRO intake/outfall structure and the confluence with the River Thame, which is covered in the WFD surface water body Thames (Evenlode to Thame). However, there are four further WFD water bodies downstream of the works that may still be affected due to the changes being made to the volumes of water in the Thames from abstraction and augmentation and potential impacts on water quality from the augmentations (Figure 5-2). These are:

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

5.2.5 As abstraction from the Thames will only occur during high flows (above the Q50) and no new barriers to fish migration will be implemented on the River Thames; it is assumed that there will be no pathway for impacts on migratory species in any upstream Thames waterbodies beyond the Thames (Evenlode to Thame). Therefore, upstream water bodies on the Thames have been Screened out of further assessment. The WFD water body downstream of the Teddington has not been screened into this assessment as impacts associated with SESRO are likely to be dissipated by this point. This was determined through hydrological modelling which incorporates abstractions which will take place along the River Thames when SESRO is augmenting flows.

5.2.6 Therefore, a total of ten WFD surface water bodies were initially screened into the assessment in Gate 2 (see Figure 5-2).

5.3 WFD groundwater bodies

5.3.1 Groundwater bodies were reviewed as part of the Stage 1 screening assessment. Two groundwater bodies, as defined by the Water Framework Directive exist close to the Project: Shrivenham Corallian (GB40602G60060) and Vale of White Horse Chalk (GB40601G601000) (see Figure 5.5). However, no WFD groundwater body underlies the indicative location of SESRO.

5.3.2 Shrivenham Corallian (GB40602G60060) is located north of the footprint (boundary around Marcham and Shippon, c. 1 km from the northern boundary of the indicative location of SESRO), this groundwater body is associated with the limestone and sandstone bedrock geologies of the Stanford Formation, Kingston Formation and Hazelbury Bryan Formation. As well as being separated from the location of the proposed reservoir by distance, the unproductive Ampthill Clay Formation and Kimmeridge Clay Formation underlying the indicative SESRO location limits the hydraulic connectivity with the groundwater body. The excavation of the reservoir at the deepest point is around 15m below ground level whereas the depth of the Corallian is around 40m below ground level. This retains sufficient Kimmeridge Clay below the reservoir base to mitigate the risk of heave from uplift in the underlying Corallian. Furthermore, the River Ock is a hydraulic barrier to any connection to the south. Therefore, this groundwater body can be screened out from any further assessment.

5.3.3 Vale of White Horse Chalk (GB40601G601000) groundwater body is associated with the Chalk and Upper Greensand bedrock geology formations located south of the footprint (boundary located c. 1.6 km south of the indicative location of SESRO). This aquifer is separated from the water environment of the site by multiple unproductive formations: the Ampthill Clay Formation, Kimmeridge Clay Formation and the Gault Formation. Additionally, the groundwater flow in this aquifer is broadly to the south, away from the indicative location of SESRO. Thus, this groundwater body can also be screened out from any further assessment.

5.3.4 Within the vicinity of the proposed reservoir there is a superficial aquifer which underlies much of the site, associated with the Northmoor Sand and Gravel Member, the Summertown-Radley Sand and Gravel Member, Wolvercote Sand and Gravel Member and Alluvium superficial deposits. This is designated as a Secondary A aquifer (defined as “permeable layers that can support local water supplies and may form an important source of base flow to rivers”). There is also a small, isolated area of Secondary (undifferentiated) aquifer to the east of the site. Neither of these superficial aquifers are WFD groundwater bodies.

5.3.5 The proposed Project may locally affect the groundwater flow in the vicinity of the reservoir but not the WFD groundwater bodies to the north and south of the site. Therefore, all impacts to WFD groundwater bodies have been screened out from further assessment. Further assessment with respect to localised changes in the hyporheic zone would be undertaken during subsequent project stages to assess impacts around watercourse diversions.

5.4 Other water bodies

5.4.1 There is equally no potential for WFD artificial, lake, or transitional water bodies to be affected by the proposed Project as none are within the indicative Project boundary or would be even if the indicative Project boundary was extended to include the areas of the floodplain around any lengths of Childrey Brook experiencing increased flow. Therefore, there are none screened into the assessment. It is worth noting that a footprint of an old canal is within the Project footprint and the Project is being developed to allow room for its restoration by others at some point in the future albeit in a slightly different location than its historical position. The new proposed reservoir could become a new lake water body.

5.5 Zone of Influence

5.5.1 Based on the information provided above, the ZoI of the Project is the WFD river water body catchments which directly interact with the Project Footprint (i.e. The River Ock and its tributaries) and the River Thames between the outfall/intake structure and the tidal limit at Teddington.

5.5.2 As the project progresses through subsequent stages, if any of the activities, baseline data or design assumptions change, this WFD assessment would be reviewed and the ZoI updated.

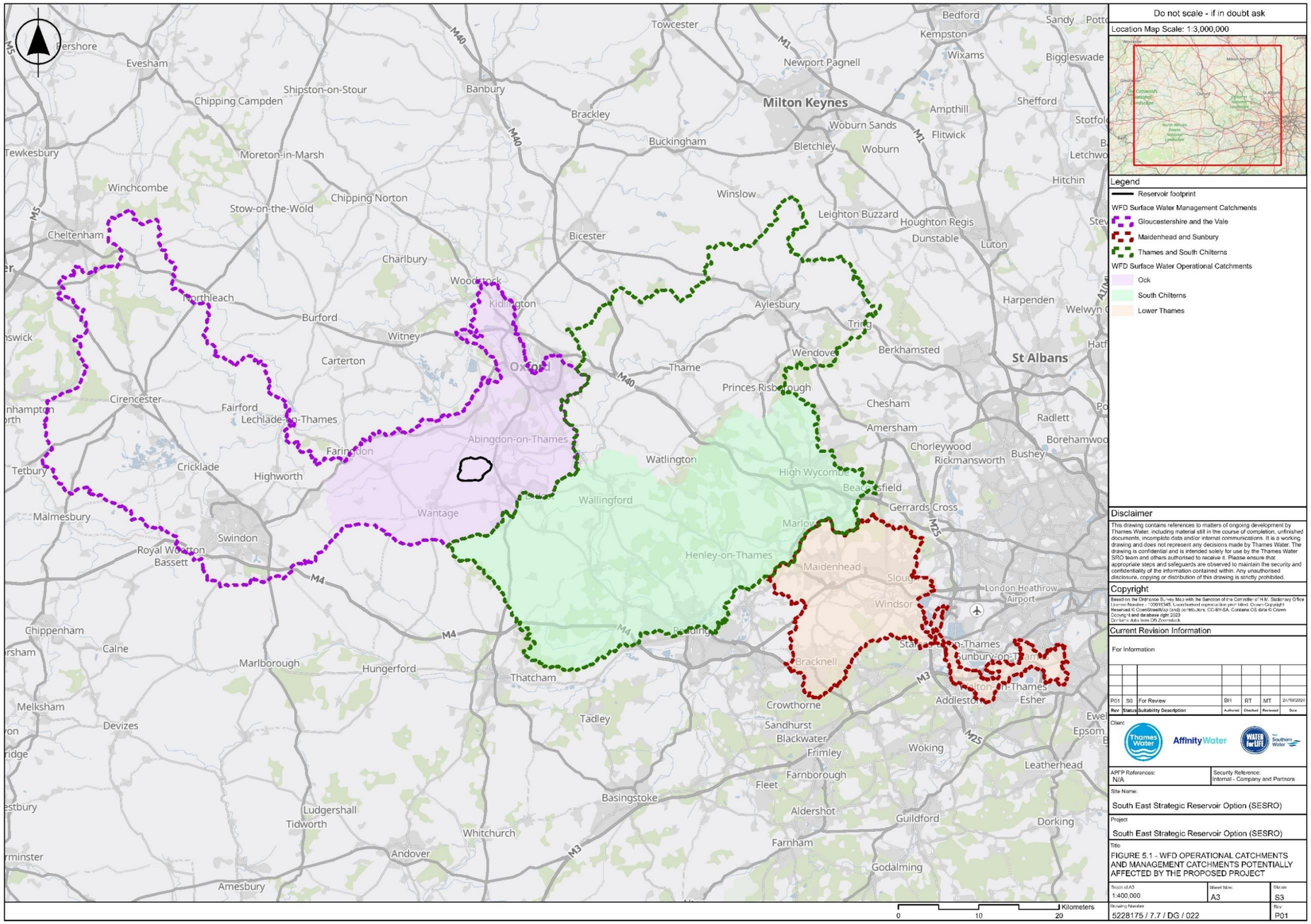

Figure 5-1 WFD operational catchments and management catchments potentially affected by the proposed Project

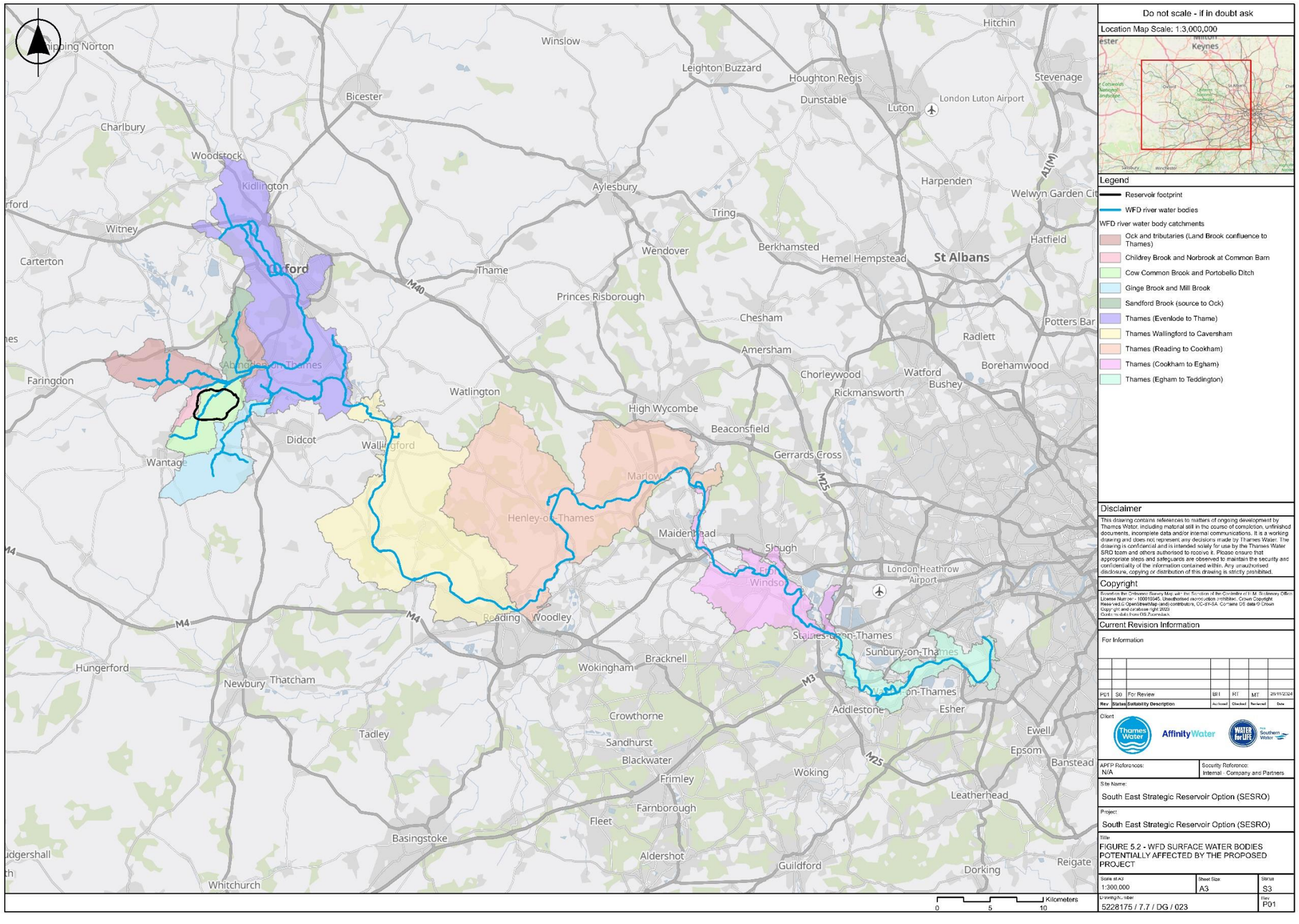

Figure 5-2 WFD water bodies potentially affected by the proposed Project

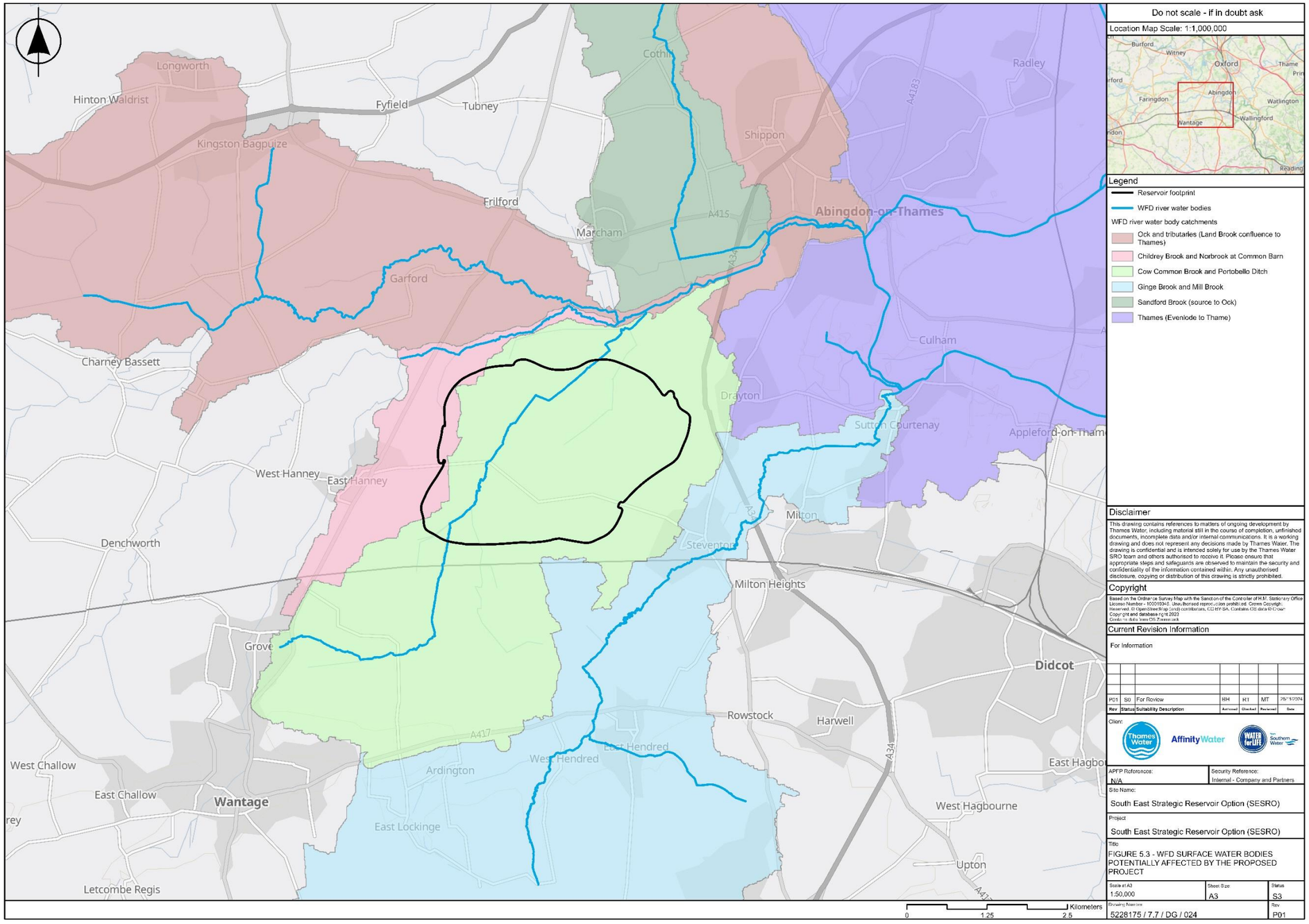

Figure 5-3 WFD surface water bodies potentially affected by the proposed Project

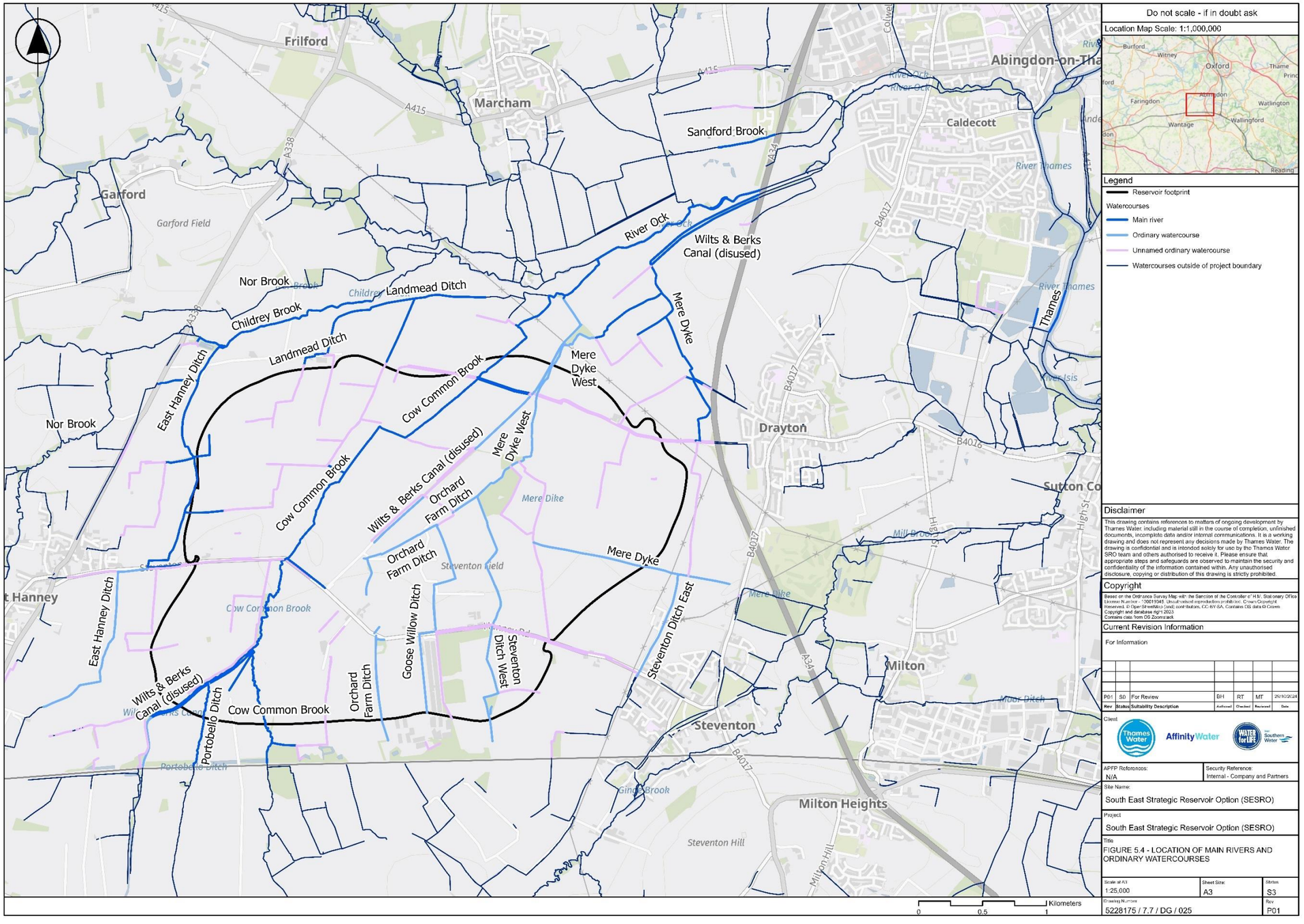

Figure 5-4 Location of named Main Rivers and Ordinary Watercourses, and the codes given to unnamed Ordinary Watercourses

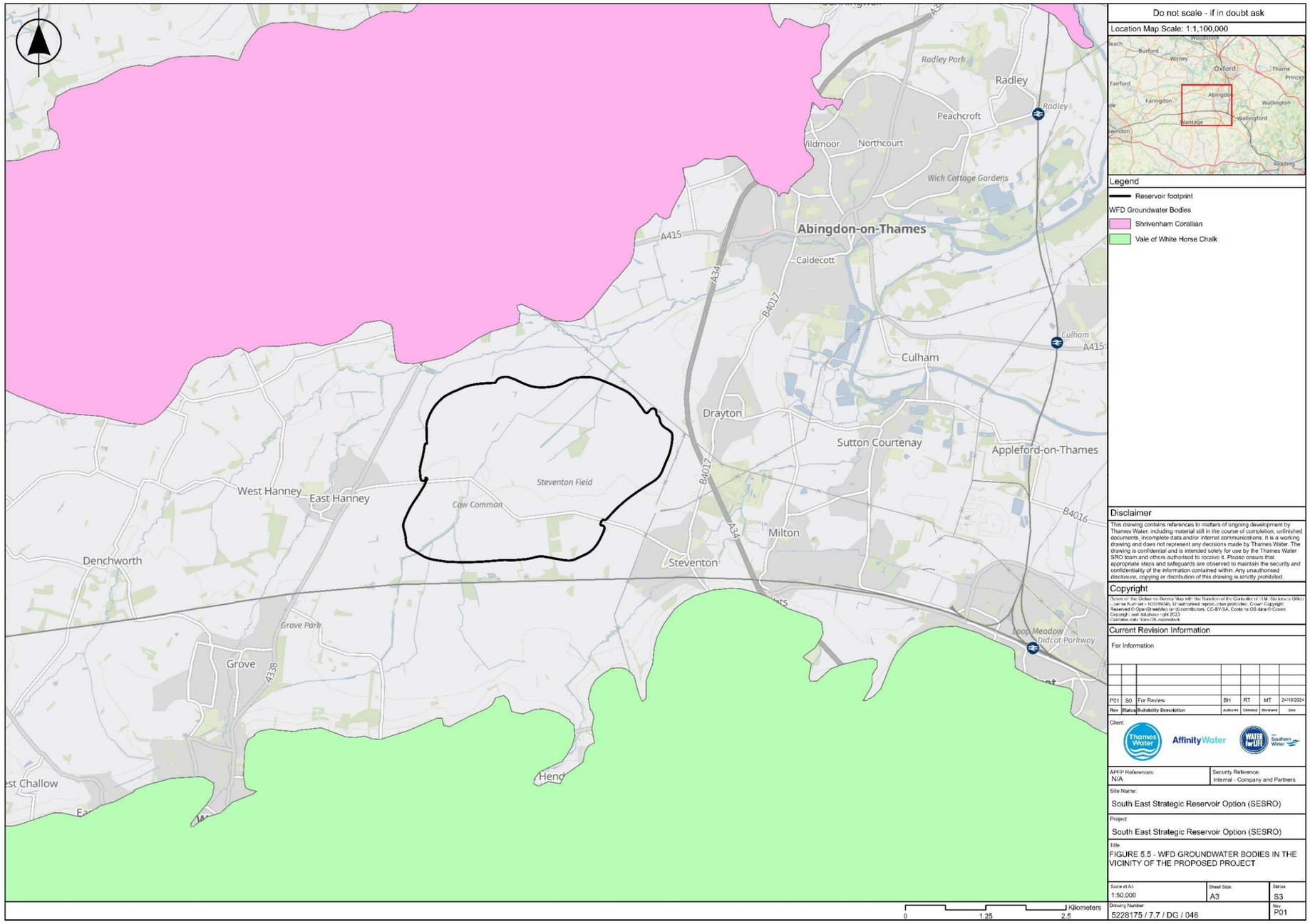

Figure 5-5 Location of WFD Groundwater bodies in the vicinity of the proposed Project

5.6 Surface water baseline findings

5.6.1 This section provides a summary of the baseline WFD status information for the water bodies identified within the ZoI including the Reasons for Not Achieving Good (RNAG) status where appropriate. The information provided in Table 5.1 to Table 5.10 has been sourced from the Environment Agency's Catchment Data Explorer.[23]

5.6.2 From 2018 additional substances were reported by the Environment Agency within the RBMP framework[5]. These were not formal status elements in RBMP2 (2015) although they were brought in during an interim (2019) update. However, RBMP3 (2021/2022) does include a formal status for these new substances and so they are included within this assessment.

Childrey Brook and Norbrook at Common Barn (GB106039023380)

5.6.3 Table 5.1 provides information from the 2019 and 2022 Cycle 3 WFD assessment and RBMP3 data for the Childrey Brook and Norbrook at Common Barn surface water body. The water body is not designated as an artificial or heavily modified water body (A/HMWB) and therefore is expected to reach GES.

5.6.4 The water body is currently at Poor status. This is due to both ecological and chemical status, with macrophytes and phytobenthos at Poor, Phosphate at Poor, Cypermethrin at Fail in Priority Substances and Polybrominated Diphenyl Ethers (PBDE) and mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body is now to reach Good by 2063, the length of time required is due to the Chemical status recovery time of Polybrominated Diphenyl Ethers (PBDE).

5.6.5 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023)[24] as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore directly relates to the 2019 classification data.

5.6.6 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – sewage discharge both intermittent and continuous from the water industry responsible for phosphate and macrophytes and phytobenthos combined;
- Diffuse source – poor livestock management in the agriculture and rural land management category responsible for phosphate and macrophytes and phytobenthos combined;

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[23] *England | Catchment Data Explorer*
[24] *Environment Agency, 2024, Catchment Data Explorer. https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/6*

- Physical modification – land use (arable) in the agriculture and rural land management category responsible for macrophytes and phytobenthos combined; and
- Measures delivered to address reason, awaiting classification, no sector responsible for mercury and its compounds and PBDE.

Table 5.1 Childrey Brook and Norbrook at Common Barn WFD surface water body

Water body name	Childrey Brook and Norbrook at Common Barn		
Water body ID	GB106039023380		
National Grid Reference	SU4424195147		
River Basin District	Thames		
Management catchment	Gloucestershire and the Vale		
Operational catchment	Ock		
A/HMWB	Not designated A/HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Poor	-	Good 2063
Ecological	Poor	Poor	Good 2027
Biological Quality Elements	Poor	Poor	Good 2027
Macrophytes and phytobenthos	Poor	Poor	Good 2027
Fish	Not assessed	Not assessed	-
Invertebrates	High	High	Good 2015
Hydromorphological supporting elements	Supports Good	Supports Good	Supports Good 2015
Hydrological regime	Supports Good	Supports Good	Supports Good 2015
Morphology	Supports Good	Supports Good	-
Physico-chemical Quality Elements	Moderate	Moderate	Good 2027
Ammoniacal nitrogen	High	Good	Good 2015

Water body name	Childrey Brook and Norbrook at Common Barn		
Dissolved Oxygen	High	High	Good 2015
pH	High	High	Good 2015
Phosphate	Moderate	Poor	Good 2027
Temperature	High	High	Good 2015
Specific pollutants	Not assessed	Not assessed	Not assessed 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Fail	Does not require assessment	Good 2039
Cypermethrin	Fail	-	Good 2039
Fluoranthene	Good	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Good	-	Good 2015
Benzo(a)pyrene	Good	-	Good 2015
Dioxins and dioxin-like compounds	Good	-	Good 2015
Heptachlor and cis-Heptachlor epoxide	Good	-	Good 2015
Hexabromocyclododecane (HBCDD)	Good	-	Good 2015

Water body name	Childrey Brook and Norbrook at Common Barn		
Hexachlorobenzene	Good	-	Good 2015
Hexachlorobutadiene	Good	-	Good 2015
Mercury and Its Compounds	Fail	-	Good 2040

Sandford Brook (Source to Ock) (GB106039023410)

5.6.7 Table 5.2 provides information from the 2019 and 2022 Cycle 3 WFD assessment and RBMP3 data for the Sandford Brook (Source to Ock) surface water body. The water body is not designated as an A/HMWB and therefore is expected to reach GES.

5.6.8 The water body is currently at Poor status. This is due to both ecological and chemical status, with macrophytes and phytobenthos at Poor, and polybrominated diphenyl ethers (PBDE) and mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body is to reach Good Status by 2063. The length of time required is due to the Chemical status recovery time of Polybrominated diphenyl ethers (PBDE).

5.6.9 There are no reasons for not achieving GES for this water body currently on the Environment Agency's Catchment Data Explorer (2023) in relation to the 2022 due to the lack of status information in Cycle 3. Therefore, the RNAG reported refer to the 2019 classification data, at this point the water body was assessed as being at Poor status. There is however a reason given for failing chemical status:

- Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.

Table 5.2 Sandford Brook (Source to Ock) WFD surface water body classification

Water body name	Sandford Brook (Source to Ock)		
Water body ID	GB106039023410		
National Grid Reference	SU4693698504		
River Basin District	Thames		
Management catchment	Gloucestershire and the Vale		
Operational catchment	Ock		
A/HMWB	Not designated A/HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Poor	-	Good 2063
Ecological	Poor	-	Good 2027
Biological Quality Elements	Poor	-	Good 2027
Macrophytes and phytobenthos	Poor	-	Good 2027
Fish	Not assessed	Not assessed	-
Invertebrates	Good	-	Good 2015
Hydromorphological supporting elements	Supports Good	-	Supports Good 2015
Hydrological regime	High	-	Supports Good 2015
Physico-chemical Quality Elements	High	-	Good 2015
Ammoniacal nitrogen	High	-	Good 2015
Dissolved Oxygen	High	-	Good 2015
pH	High	-	Good 2015
Phosphate	High	-	Good 2015
Temperature	High	-	Good 2015
Specific pollutants	Not assessed	Not assessed	Not assessed 2015

Water body name	Sandford Brook (Source to Ock)		
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Good	-	Good 2015
Benzo(a)pyrene	Good	-	Good 2015
Dioxins and dioxin-like compounds	Good	-	Good 2015
Heptachlor and cis-Heptachlor epoxide	Good	-	Good 2015
Hexabromocyclododecane (HBCDD)	Good	-	Good 2015
Hexachlorobenzene	Good	-	Good 2015
Hexachlorobutadiene	Good	-	Good 2015
Mercury and Its Compounds	Fail	-	Good 2040

Cow Common Brook and Portobello Ditch (GB106039023360)

5.6.10 Table 5.3 provides information from the 2019 and 2022 Cycle 3 WFD assessment and RBMP3 data for the Cow Common Brook and Portobello Ditch surface water body. The water body is not designated as an A/HMWB and therefore is expected to reach GES.

5.6.11 The water body is currently at Poor status. This is due to both ecological and chemical status, with macrophytes and phytobenthos at Poor, invertebrates at Moderate, Dissolved Oxygen at Bad, Phosphate at Poor and Polybrominated Diphenyl Ethers (PBDE) and Mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body is to reach Good Status by 2063. The length of time required is due to the Chemical status recovery time of Polybrominated diphenyl ethers (PBDE).

5.6.12 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.13 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous sewage discharge from urban and transport and domestic general public responsible for Macrophytes and Phytobenthos Combined, Phosphate and Dissolved Oxygen;
- Diffuse source – poor livestock and nutrient management in the agriculture and rural land management category responsible for Macrophytes and Phytobenthos Combined, Phosphate and Dissolved Oxygen;
- Physical modification – land use (arable) in the agriculture and rural land management category responsible for invertebrates;
- Natural – drought responsible for Dissolved Oxygen and other natural conditions responsible for invertebrates;
- Suspect data – responsible for Macrophytes and Phytobenthos Combined; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.

Table 5.3 Cow Common Brook and Portobello Ditch WFD surface water body classification

Water body name	Cow Common Brook and Portobello Ditch		
Water body ID	GB106039023360		
National Grid Reference	SU4341192347		
River Basin District	Thames		
Management catchment	Gloucestershire and the Vale		
Operational catchment	Ock		
A/HMWB	Not designated A/HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Poor	-	Good 2063
Ecological	Poor	-	Good 2027
Biological Quality Elements	Poor	-	Good 2027
Fish	Not assessed	Not assessed	-
Invertebrates	Moderate	-	Good 2027
Macrophytes and phytobenthos	Poor	-	Good 2027
Hydromorphological supporting elements	Supports Good	-	Supports Good 2015
Hydrological regime	High	-	Supports Good 2015
Morphology	Supports Good	-	-
Physico-chemical Quality Elements	Moderate	-	Good 2027
Ammoniacal nitrogen	High	-	Good 2015
Dissolved Oxygen	Bad	-	Good 2027
pH	High	-	Good 2015
Phosphate	Poor	-	Good 2027

Water body name	Cow Common Brook and Portobello Ditch		
Temperature	High	-	Good 2015
Specific pollutants	Not assessed	Not assessed	Not assessed 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Good	-	Good 2015
Benzo(a)pyrene	Good	-	Good 2015
Dioxins and dioxin-like compounds	Good	-	Good 2015
Heptachlor and cis-Heptachlor epoxide	Good	-	Good 2015
Hexabromocyclododecane (HBCDD)	Good	-	Good 2015
Hexachlorobenzene	Good	-	Good 2015
Hexachlorobutadiene	Good	-	Good 2015

Water body name	Cow Common Brook and Portobello Ditch		
Mercury and Its Compounds	Fail	-	Good 2040

Ginge Brook and Mill Brook (GB106039023660)

5.6.14 Table 5.4 provides information from the 2019 and 2022 Cycle 3 WFD data and RBMP3 data for the Ginge Brook and Mill Brook surface water body. The water body is not designated as an A/HMWB and therefore is expected to reach GES.

5.6.15 The water body is currently at Moderate status. This is due to both ecological and chemical status, with macrophytes and phytobenthos and fish at Moderate, Phosphate at moderate, and Polybrominated Diphenyl Ethers (PBDE), Perfluorooctane Sulphonate (PFOS) and Mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body was to reach Moderate by 2015 so it has reached its objective. The reason for an objective below Good is unfavourable balance of costs and benefits.

5.6.16 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.17 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous sewage discharge from the Water Industry responsible for Macrophytes and Phytobenthos Combined and Phosphate;
- Other pressures – responsible for Macrophytes and Phytobenthos Combined;
- Unknown (pending investigation) – sector under investigation responsible for PFOS; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.

Table 5.4 Ginge Brook and Mill Brook WFD surface water body classification

Water body name	Ginge Brook and Mill Brook		
Water body ID	GB106039023660		
National Grid Reference	SU4664188618		
River Basin District	Thames		
Management catchment	Gloucestershire and the Vale		
Operational catchment	Ock		
A/HMWB	Not designated A/HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Moderate	-	Moderate 2015
Ecological	Moderate	Moderate	Moderate 2015
Biological Quality Elements	Moderate	Moderate	Good 2027
Fish	Not assessed	Not assessed	-
Invertebrates	High	High	Good 2015
Macrophytes and phytobenthos	Moderate	Moderate	Good 2027
Hydromorphological supporting elements	Supports Good	Supports Good	Supports Good 2015
Hydrological regime	Supports Good	Supports Good	Supports Good 2015
Morphology	Supports Good	Supports Good	-
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Ammoniacal Nitrogen	High	High	Good 2015
Dissolved Oxygen	High	High	Good 2015
pH	High	High	Good 2015

Water body name	Ginge Brook and Mill Brook		
Phosphate	Moderate	Poor	Moderate 2015
Temperature	High	High	Good 2015
Specific pollutants	Not assessed	Not assessed	Not assessed 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Benzo(a)pyrene	Good	-	Good 2015
Dioxins and dioxin-like compounds	Good	-	Good 2015
Heptachlor and cis-Heptachlor epoxide	Good	-	Good 2015
Hexabromocyclododecane (HBCDD)	Good	-	Good 2015
Hexachlorobenzene	Good	-	Good 2015

Water body name	Ginge Brook and Mill Brook		
Hexachlorobutadiene	Good	-	Good 2015
Mercury and Its Compounds	Fail	-	Good 2040

Ock and tributaries (Land Brook confluence to Thames) (GB106039023430)

5.6.18 Table 5.5 provides information from the 2019 and 2022 Cycle 3 WFD data and the RBMP3 data for the Ock and tributaries (Land Brook confluence to Thames) surface water body. The water body is not designated as an A/HMWB and therefore is expected to reach GES.

5.6.19 The water body is currently at Poor status. This is due to both ecological and chemical status, with fish at Poor, Phosphate at Poor, and Polybrominated Diphenyl Ethers (PBDE), Perfluorooctane Sulphonate (PFOS) and Mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body is to reach Moderate status by 2015, which it has not achieved. The reasons for an objective below good are, disproportionate burdens, disproportionately expensive, ecological recovery time, no known technical solution is available and chemical status recovery time.

5.6.20 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.21 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous and intermittent sewage discharge from the Water Industry responsible for Phosphate;
- Diffuse source – poor livestock and nutrient management in the agriculture and rural land management category responsible for Phosphate;
- Physical modification – land drainage and barriers to ecological discontinuity from agriculture and land use management responsible for fish;
- Unknown (pending investigation) – sector under investigation responsible for PFOS; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.

Table 5.5 Ock and tributaries (Land Brook confluence to Thames) WFD surface water body classification

Water body name	Ock and tributaries (Land Brook confluence to Thames)
Water body ID	GB106039023430

Water body name	Ock and tributaries (Land Brook confluence to Thames)		
National Grid Reference	SU4962096695		
River Basin District	Thames		
Management catchment	Gloucestershire and the Vale		
Operational catchment	Ock		
A/HMWB	Not designated A/HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Poor	-	Moderate 2015
Ecological	Poor	Poor	Moderate 2015
Biological Quality Elements	Poor	Poor	Good 2039
Macrophytes and phytobenthos	Good	Moderate	Good 2015
Fish	Poor	Poor	Good 2039
Invertebrates	High	High	Good 2015
Hydromorphological supporting elements	Supports Good	Supports Good	Supports Good 2015
Hydrological regime	Supports Good	Supports Good	Supports Good 2015
Morphology	Supports Good	Supports Good	-
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Ammoniacal Nitrogen	High	High	Good 2015
Dissolved Oxygen	Good	High	Good 2015
pH	High	High	Good 2015
Phosphate	Poor	Poor	Moderate 2027
Temperature	High	High	Good 2015

Water body name	Ock and tributaries (Land Brook confluence to Thames)		
Specific pollutants	High	High	High 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Others (Priority substances)	-	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Mercury and Its Compounds	Fail	-	Good 2040
Others (Priority hazardous substances)	-	-	Good 2015

Thames (Evenlode to Thame) (GB106039030334)

5.6.22 Table 5.6 provides information from the 2019 and 2022 Cycle 3 WFD assessment and the RBMP3 data for the Thames (Evenlode to Thame) surface water body. The water body is not designated as an A/HMWB and therefore is expected to reach GES. The reason for the water body not being designated a HMWB is due to the length of the Oxford watercourses (flow-dependent tributaries) exceeding that of the main navigation in this water body.

5.6.23 The water body is currently at Poor status. This is due to both ecological and chemical status, with fish at Poor, phosphate at Moderate, and Polybrominated Diphenyl Ethers (PBDE), Perfluorooctane sulphonate (PFOS) and Mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body was to reach Moderate status by 2015, which it achieved by 2019. The 2022 Cycle 3 shows the water body status having returned to Poor. The reasons for such a low objective are: disproportionately expensive, disproportionate burdens, no known technical solution is available and chemical status recovery time.

5.6.24 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.25 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous sewage discharge from the Water Industry responsible for Phosphate and Tributyltin Compounds (as of 2019 Tributyltin compounds are now at Good status, so no longer an issue);
- Diffuse source – poor nutrient management in the agriculture and rural land management category responsible for Phosphate;
- Invasive non-native species – North American signal crayfish responsible for invertebrates;
- Suspect data – responsible for invertebrates;
- Unknown (pending investigation) – sector under investigation responsible for PFOS; and
- Measures delivered to address reason, awaiting classification, no sector responsible for mercury and its compounds and PBDE.

Table 5.6 Thames (Evenlode to Thame) WFD surface water body classification

Water body name	Thames (Evenlode to Thame)		
Water body ID	GB106039030334		
National Grid Reference	SP4574111361		
River Basin District	Thames		
Management catchment	Gloucestershire and the Vale		
Operational catchment	Ock		
A/HMWB	Not designated A/HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Moderate	-	Moderate 2015
Ecological	Moderate	Poor	Moderate 2015
Biological Quality Elements	Moderate	Poor	Good 2027
Macrophytes and phytobenthos	Not assessed	Not assessed	-
Fish	Good	Poor	Good 2021
Invertebrates	Moderate	High	Good 2027
Hydromorphological supporting elements	Supports Good	Supports Good	Supports Good 2015
Hydrological regime	Supports Good	Supports Good	Supports Good 2015
Morphology	Supports Good	Supports Good	-
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Ammoniacal Nitrogen	High	High	Good 2015
Dissolved Oxygen	High	High	Good 2015
pH	High	High	Good 2015

Water body name	Thames (Evenlode to Thame)		
Phosphate	Moderate	Moderate	Moderate 2015
Temperature	High	High	Good 2015
Specific pollutants	High	High	High 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Others	Good	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Mercury and Its Compounds	Fail	-	Good 2040
Tributyltin Compounds	Good	-	Good 2021
Others	Good	-	Good 2015

Thames Wallingford to Caversham (GB106039030331)

5.6.26 Table 5.7 provides information from the 2019 and 2022 Cycle 3 WFD data and the RBMP3 data for the Thames Wallingford to Caversham surface water body.

The water body is designated as a HMWB (flood protection, tourism and recreation, navigation) and therefore is expected to reach GEP rather than GES.

5.6.27 The water body is currently at Moderate status. This is due to both ecological and chemical status, with Mitigation Measures assessment at Moderate or less, Phosphate at Moderate, Cypermethrin at Fail in Priority substances, and Polybrominated Diphenyl Ethers (PBDE), Perfluorooctane Sulphonate (PFOS), Benzo(b)fluoranthene, Benzo(g-h-i)perylene and Mercury and its compounds at Fail in Priority Hazardous Substances. The objective for the water body was to reach Moderate by 2015 which it has achieved. The reasons for an objective below Good are cause of adverse impact unknown, disproportionate burdens, no known technical solution is available, practical technical constraints prevent implementation of the measure by an earlier deadline and chemical status recovery time.

5.6.28 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.29 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous sewage discharge from the Water Industry responsible for Phosphate;
- Diffuse source – from agriculture and rural land management for Phosphate;
- Physical modification – in the categories of Recreation, Navigation and Local and Central Government responsible for Mitigation Measures Assessment;
- Unknown (pending investigation) – sector under investigation responsible for Benzo(g-h-i)perylene, Benzo(b)fluoranthene and PFOS; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.

Table 5.7 Thames Wallingford to Caversham WFD surface water body classification

Water body name	Thames Wallingford to Caversham		
Water body ID	GB106039030331		
National Grid Reference	SU5975592031		
River Basin District	Thames		
Management catchment	Thames and Chilterns South		
Operational catchment	Chilterns South		
A/HMWB	HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3

Water body name	Thames Wallingford to Caversham		
Overall Water Body	Moderate	-	Moderate 2015
Ecological	Moderate	Moderate	Moderate 2015
Supporting elements	Moderate	Moderate	Good 2027
Mitigation Measures assessment	Moderate or less	Moderate or less	Good 2027
Biological Quality Elements	High	High	Good 2021
Macrophytes and phytobenthos	-	-	Not assessed 2021
Fish	Not assessed	Not assessed	-
Invertebrates	High	High	Good 2021
Hydromorphological supporting elements	Supports Good	Supports Good	Supports Good 2015
Hydrological regime	Supports Good	Supports Good	Supports Good 2021
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Acid Neutralising Capacity	High	High	Good 2015
Ammoniacal Nitrogen	High	High	Good 2015
Dissolved Oxygen	High	High	Good 2015
pH	High	High	Good 2015
Phosphate	Moderate	Moderate	Moderate 2015
Temperature	High	High	Good 2015
Specific pollutants	High	High	High 2021
Copper	High	High	High 2015
Iron	High	High	High 2015
Manganese	High	High	High 2015

Water body name	Thames Wallingford to Caversham		
Triclosan	High	High	High 2021
Zinc	High	High	High 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Fail	Does not require assessment	Good 2039
Cypermethrin	Fail	-	Good 2039
Fluoranthene	Good	-	Good 2015
Others (priority substances)	Good	-	Good 2015
Other Pollutants	Good	Does not require assessment	Good 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Benzo(b)fluoranthene	Fail	-	Good 2033
Benzo(g-h-i)perylene	Fail	-	Good 2033
Mercury and its compounds	Fail	-	Good 2040
Others	Good	-	Good 2015

Thames (Reading to Cookham) (GB106039023233)

5.6.30 Table 5.8 provides information from the 2019 and 2022 Cycle 3 WFD data and RBMP3 data for the Thames (Reading to Cookham) surface water body. The water body is designated as a HMWB (tourism and recreation, navigation) and therefore is expected to reach GEP rather than GES.

5.6.31 The water body is currently at Moderate status. This is due to both ecological and chemical status, with Mitigation Measures assessment at Moderate or Less, Phosphate at Moderate, and Polybrominated Diphenyl Ethers (PBDE), Perfluorooctane sulphonate (PFOS), Benzo(b)fluoranthene and Benzo(g-h-i)perylene at Fail in Priority Hazardous Substances. The objective for the water body was to reach Moderate by 2015 which it has achieved. The reasons for an objective below Good are disproportionate burdens, Practical technical constraints prevent implementation of the measure by an earlier deadline, no known technical solution is available and Chemical status recovery time.

5.6.32 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.33 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous sewage discharge from the Water Industry responsible for Phosphate;
- Physical modification – in the categories of Recreation and Navigation responsible for Mitigation Measures Assessment;
- Unknown (pending investigation) – sector under investigation responsible for Benzo(g-h-i)perylene, Benzo(b)fluoranthene and PFOS; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for PBDE.

Table 5.8 Thames (Reading to Cookham) WFD surface water body classification

Water body name	Thames (Reading to Cookham)		
Water body ID	GB106039023233		
National Grid Reference	SU8387684421		
River Basin District	Thames		
Management catchment	Thames and Chilterns South		
Operational catchment	Chilterns South		
A/HMWB	HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Moderate	-	Moderate 2015
Ecological	Moderate	Moderate	Moderate 2015
Supporting elements	Moderate	Moderate	Good 2027

Water body name	Thames (Reading to Cookham)		
Mitigation Measures assessment	Moderate or less	Moderate or less	Good 2027
Biological Quality Elements	Good	Good	Good 2015
Macrophytes and phytobenthos	Not assessed	Not assessed	Not assessed 2015
Fish	Not assessed	Not assessed	-
Invertebrates	Good	Good	Good 2015
Hydromorphological supporting elements	Supports Good	Supports Good	Supports Good 2015
Hydrological regime	Supports Good	Supports Good	Supports Good 2015
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Ammoniacal Nitrogen	High	High	Good 2015
Dissolved Oxygen	Good	High	Good 2015
pH	High	High	Good 2015
Phosphate	Moderate	Moderate	Moderate 2015
Temperature	Good	Moderate	Good 2015
Specific pollutants	High	High	High 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Others (priority substances)	Good	-	Good 2015

Water body name	Thames (Reading to Cookham)		
Other Pollutants	Does not require assessment	Does not require assessment	Does not require assessment 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Benzo(b)fluoranthene	Fail	-	Good 2033
Benzo(g-h-i)perylene	Fail	-	Good 2033
Others (priority hazardous substances)	Good	-	Good 2015

Thames (Cookham to Egham) (GB106039023231)

5.6.34 Table 5.9 provides information from the 2019 and 2022 Cycle 3 WFD data and RBMP3 data for the Thames (Cookham to Egham) surface water body. The water body is designated as a HMWB (flood protection, navigation, drinking water supply) and therefore is expected to reach GEP rather than GES.

5.6.35 The water body is currently at Moderate status. This is due to both ecological and chemical status, with Mitigation Measures assessment at Moderate or less, Phosphate at Moderate, and Polybrominated Diphenyl Ethers (PBDE), and Perfluorooctane sulphonate (PFOS) at Fail in Priority Hazardous Substances. The objective for this water body was to reach Moderate Status by 2015 which it achieved. The reasons for an objective below Good are, no known technical solution is available, Practical technical constraints prevent implementation of the measure by an earlier deadline and Chemical status recovery time.

5.6.36 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.37 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous and intermittent sewage discharge from the Water Industry responsible for Phosphate;
- Diffuse source – poor nutrient management in the agriculture and rural land management category and Transport Drainage in the urban and transport sector responsible for Phosphate;
- Physical modification – by local and central government, the water industry and for navigation responsible for Mitigation Measures Assessment;
- Unknown (pending investigation) – sector under investigation responsible for PFOS; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for PBDE.

Table 5.9 Thames (Cookham to Egham) WFD surface water body classification

Water body name	Thames (Cookham to Egham)		
Water body ID	GB106039023231		
National Grid Reference	TQ0099272440		
River Basin District	Thames		
Management catchment	Maidenhead and Sunbury		
Operational catchment	Thames Lower		
A/HMWB	HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Moderate	-	Moderate 2015
Ecological	Moderate	Moderate	Moderate 2015
Supporting elements	Moderate	Moderate	Good 2033
Mitigation Measures assessment	Moderate or less	Moderate or less	Good 2033
Biological Quality Elements	Good	Good	Good 2015
Macrophytes and phytobenthos	Not assessed	Not assessed	Not assessed 2015
Fish	Not assessed	Not assessed	-
Invertebrates	Good	Good	Good 2015

Water body name	Thames (Cookham to Egham)		
Hydromorphological supporting elements	Not assessed	Not assessed	Not assessed 2015
Hydrological regime	Not assessed	Not assessed	-
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Acid Neutralising Capacity	High	High	Good 2015
Ammoniacal Nitrogen	High	High	Good 2015
Dissolved Oxygen	High	High	Good 2015
pH	High	High	Good 2015
Phosphate	Moderate	Moderate	Moderate 2015
Temperature	High	High	Good 2015
Specific pollutants	High	High	High 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Good	Does not require assessment	Good 2015
Cypermethrin (Priority hazardous)	Good	-	Good 2015
Fluoranthene	Good	-	Good 2015
Others (priority substances)	Good	-	Good 2015
Other Pollutants	Good	Does not require assessment	Good 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Others (priority hazardous substances)	Good	-	Good 2015

Thames (Egham to Teddington) (GB106039023232)

5.6.38 Table 5.10 provides information from the 2019 and 2022 Cycle 3 WFD data and RBMP3 data for the Thames (Egham to Teddington) surface water body. The water body is designated as a HMWB (flood protection, tourism and recreation, drinking water supply) and therefore is expected to reach GEP rather than GES.

5.6.39 The water body is currently at Poor status. This is due to both ecological and chemical status, with Mitigation Measures assessment at Moderate or less, macrophytes and phytobenthos and invertebrates at Poor, Phosphate and temperature at moderate, Cypermethrin at Fail in Priority Substances and Polybrominated Diphenyl Ethers (PBDE), Perfluorooctane Sulphonate (PFOS) and Tributyltin Compounds at Fail in Priority Hazardous Substances. The objective for this water body was to reach Poor by 2015. The reasons for an objective below Good are no known technical solution is available, practical technical constraints prevent implementation of the measure by an earlier deadline, chemical status recovery time and cause of adverse impact unknown.

5.6.40 The classification data were taken from the Environment Agency's Catchment Data Explorer (2023) as were the reasons for not achieving GES. However, the chemical classification data has not been updated in 2022 Cycle 3 and therefore relate to the 2019 classification data.

5.6.41 RNAG identified for the catchment in Cycle 3 are listed below.

- Point source – continuous sewage discharge from the Water Industry responsible for Macrophytes and Phytobenthos Combined, Phosphate and Temperature;
- Diffuse source – poor nutrient management in the agriculture and rural land management category responsible for Macrophytes and Phytobenthos Combined and Phosphate. Transport Drainage in the urban and transport sector responsible for Phosphate;
- Physical modification – by local and central government, the water industry and for navigation responsible for Mitigation Measures Assessment. Water level management in impounded water bodies responsible for temperature;
- Flow – low flow (not drought) responsible for temperature;
- Unknown (pending investigation) – sector under investigation responsible for PFOS; and
- Measures delivered to address reason, awaiting recovery, no sector responsible for PBDE.

Table 5.10 Thames (Egham to Teddington) WFD surface water body classification

Water body name	Thames (Egham to Teddington)
Water body ID	GB106039023232
National Grid Reference	TQ0505668161

Water body name	Thames (Egham to Teddington)		
River Basin District	Thames		
Management catchment	Maidenhead and Sunbury		
Operational catchment	Thames Lower		
A/HMWB	HMWB		
Classification	2019 Cycle 3	2022 Cycle 3	Objectives RBMP3
Overall Water Body	Poor	-	Poor 2015
Ecological	Poor	Poor	Poor 2015
Supporting elements (Surface Water)	Moderate	Moderate	Good 2033
Mitigation Measures Assessment	Moderate or less	Moderate or less	Good 2033
Biological Quality Elements	Poor	Poor	Poor 2015
Macrophytes and phytobenthos	Poor	Poor	Poor 2015
Fish	Not assessed	Not assessed	-
Invertebrates	Poor	High	Good 2015
Hydromorphological supporting elements	Not assessed	Not assessed	Not assessed 2015
Hydrological regime	Not assessed	Not assessed	-
Physico-chemical Quality Elements	Moderate	Moderate	Moderate 2015
Acid Neutralising Capacity	High	High	Good 2015
Ammoniacal Nitrogen	High	High	Good 2015
Biochemical Oxygen Demand (BOD)	Not assessed	Good	-
Dissolved Oxygen	Good	Good	Good 2015
pH	High	High	Good 2015
Phosphate	Moderate	Moderate	Moderate 2015

Water body name	Thames (Egham to Teddington)		
Temperature	Moderate	Moderate	Good 2015
Specific pollutants	High	High	High 2015
Chemical	Fail	Does not require assessment	Good 2063
Priority substances	Fail	Does not require assessment	Good 2039
Cypermethrin (Priority hazardous)	Fail	-	Good 2039
Fluoranthene	Good	-	Good 2015
Others (Priority substances)	Good	-	Good 2015
Other Pollutants	Does not require assessment	Does not require assessment	Good 2015
Priority hazardous substances	Fail	Does not require assessment	Good 2063
Polybrominated diphenyl ethers (PBDE)	Fail	-	Good 2063
Perfluorooctane sulphonate (PFOS)	Fail	-	Good 2039
Tributyltin Compounds	Fail	-	Good 2039
Others (Priority hazardous substances)	Good	-	Good 2015

5.7 Stage 1 Screening assessment summary

5.7.1 Ten surface water bodies were identified as being within the ZoI of the proposed Project. Of these ten water bodies, all have the potential to be impacted and have therefore been screened into the Stage 2 Scoping assessment.

5.7.2 Two groundwater bodies were identified within close proximity to the proposed Project. However, as the footprint of the proposed Project does not extend into

the water bodies and there are anticipated to be no interactions with groundwater which extends into these water bodies, they are screened out of further assessment.

5.7.3 No other WFD water bodies were identified within the ZoI.

6. Stage 2 Scoping Assessment

6.1 Introduction

6.1.1 Data relating to specific Mitigation Measures was requested from the Environment Agency for all water bodies which are designated as A/HMWBs. These Mitigation Measures are presented in Appendix A.2 and Appendix B. Data on any additional measures associated with non A/HMWBs were also requested but no information was provided. Therefore, a review of the PoM[25] for the water bodies screened into the assessment has been completed and is presented in Appendix A.1.

6.2 Surface water baseline

6.2.1 The proposed Project footprint generally falls within the River Ock Operational Catchment and within the Cow Common Brook and Portobello Ditch (GB106039023360) water body. However, the proposed Project extends into (see Figure 5-3 and Figure 5-4 for spatial extents):

- Childrey Brook and Norbrook at Common Barn (GB106039023380);
  - The East Hanney Ditch (not a named water body will be directly impacted by the western side of the proposed Project.
- Ginge Brook and Mill Brook (GB106039023660);
  - Some of the small streams that flow south into this water body originate from north of the railway line in the vicinity of the proposed Project.
- Ock and tributaries (Land Brook confluence to Thames) (GB106039023430)
  - This water body flows to the north of the proposed Project area and receives flows from the East Hanney Ditch (via Childrey Brook), Cow Common Brook and Portobello Ditch (via Landmead Ditch) and Mere Dyke.

6.2.2 The following sections provide detailed baseline information for these water bodies based on a desktop review of historical data collected since 2000 and site visits undertaken between 17 and 19 June 2024 and previous visits in November 2021. The site visits between 17 and 19 June 2024 were part of a wider geomorphological survey,[26] and flow levels were low across the watercourses under the footprint of the Project. While there was good access on Cow Common Brook, Portobello Ditch and parts of the Mere Dyke network, access to East Hanney Ditch has to date been largely restricted and could only be viewed from public rights of way. Photograph locations from these site visits are shown in Figure 6-1. Aquatic Ecology surveys were also undertaken and are

[25] *Environment Agency, 2023, Measures Data for England, Summary programmes of measures by river basin district*
[26] *Thames Water, 2024, SESRO – Aquatic environmental factual survey reports.*

detailed in Ecological Baseline report.[27] Surveys have focused within the proposed Project footprint.

6.2.3 The Ginge Brook and Mill Brook water body was not visited during the site visits due to the limited potential for impacts associated with the Project. As a result, no water body baseline is presented below for this water body.

General description of the River Ock water environment

6.2.4 The proposed Project is in a lowland landscape primarily used for arable agriculture with some pasture and two large solar panel farms. The topography of the landscape is flat with subtle variation associated with catchment boundaries. There are various water courses of differing size and form within the boundary of the proposed Project (Figure 5-4). There are also several Main Rivers, which are described further below. The geology of the area within the footprint of the reservoir is predominantly Ampthill Clay Formation and Kimmeridge Clay Formation (undifferentiated) – Mudstone but with pockets of Gault Formation (Mudstone) and Lower Greensand Group (Sandstone). The predominant superficial deposits are Northmoor Sand and Gravel Member, Upper Facet – Sand and gravel with pockets of Head (Clay, silt, sand and gravel) and Alluvium (Clay, silt, sand and gravel).

6.2.5 Desk top review and surveys undertaken to date have shown that the aquatic ecology is reflective of the habitat availability and land use. Many of the watercourses and ditches support typical lowland macroinvertebrate and macrophyte communities that are considered pollution tolerant, indicative of nutrient enriched water, with a preference for slow flowing water and with a general low sensitivity to disturbance. Fish species recorded at relatively high abundance within the Ock catchment are also considered tolerant species and are typically minor species such as 3-spined stickleback (*Gasterosteus aculeatus*), gudgeon (*Gobio gobio*), minnow (*Phoxinus phoxinus*) and stone loach (*Barbatula barbatula*). Larger species such as roach (*Rutilus rutilus*), are were not found in high abundances, especially when compared to larger watercourses like the nearby Ock and Thames.

6.2.6 Although some notable taxa have been observed in the water bodies (discussed in the sections below), the aquatic communities of the watercourses and ditches are typically of limited conservation value, though additional ecological monitoring is ongoing to improve confidence in the baseline.

Cow Common Brook and Portobello Ditch

6.2.7 The Cow Common Brook (Table 6.1) flows through the centre of the proposed Project and is estimated from aerial imagery to be approximately 4.9 km long

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[27] *Thames Water, 2024, South East Strategic Reservoir Option (SESRO), Gate 3 Aquatic Assessment (Geomorphological, Hydrological and Water Quality Impacts) Report. Appendix A: Ecological Baseline Appendix.*

before flowing into the River Ock on the boundary of the proposed Project. The geomorphological survey suggests that over the length of the watercourse many of the banks were steep and varied between 1.5 and 2 m. The watercourse had little variation in river depth or width. For all its course the river runs through arable land. The planform is predominantly straight as a result of substantial artificial geomorphic modification with the majority of these modifications undertaken before 1900 (National Library of Scotland, 2022). Only a short section of approximately 600 m downstream of Hanney Road has been straightened since that time. Upstream of Hanney Road, the planform has retained some sinuosity and so is in an improved morphological condition with semi-vegetated berms and gravels throughout the bed. The rest of the channel is likely to have limited geomorphic or ecological value on account of its apparently limited morphological and flow diversity. Wood was observed in the bed of the channel in a variety of locations.

6.2.8 There was a mix of light and shade with pockets of tree cover but much of it was open and riparian vegetation cover was prevalent. Much of the channel would be realigned and would form part of the Cow Common Brook Diversion.

6.2.9 There are also ten ditches that flow into the Cow Common Brook. These are all artificial manmade drainage ditches, forming field boundaries, with a straight planform. These would all be realigned and would form part of the Cow Common Brook Diversion.

6.2.10 Portobello Ditch, a tributary of the Cow Common Brook, is also a Main River and has also been straightened, with limited diversity. The heavily modified channel has steep banks which varied between 1.5 m and 2 m, indicating historic deepening/channel incision. The watercourse had little variation in river depth or width. Overall, the channel is likely to provide limited aquatic value. This would be realigned and would form part of the Cow Common Brook Diversion at which point the channel would be improved in terms of habitat diversity and morphology.

6.2.11 Limited biological data are available for the surface water body. Fish survey data from 2008 (surveys undertaken as part of a targeted monitoring programme) suggest that the most abundant fish species within Cow Common Brook are stone loach, 3-spined stickleback and minnow, all species with medium to high tolerance to environmental disturbance. More contemporary data from eDNA surveys (four survey locations surveyed in spring and autumn of 2021 and 2022 and one survey location surveyed in spring 2023) confirms these species are still present, alongside 9/10-spined stickleback (*Pungitius pungitius*), roach and pike (*Esox lucius*). Only 3-spined stickleback were recorded in the Portobello Ditch eDNA surveys. No notable fish species have been recorded in the Cow Common Brook although brown/sea trout (*Salmo trutta*) and bullhead (*Cottus gobio*) have been recorded form the eDNA surveys of the Portobello Ditch.

6.2.12 Biological metrics from Environment Agency surveys undertaken within Cow Common Brook since 2010 (eight surveys in total) generally suggest a macroinvertebrate community with a high tolerance to pollution and evidence of

water quality and sediment pressures. The available data also suggest a community with a reference for different flow conditions throughout the monitoring period and exposure to flow stress (e.g. droughts). The community is typically dominated by common species (especially Chironomidae) that are tolerant of a wide range of environmental conditions, with beetles and molluscs making up a high proportion of the assemblage.

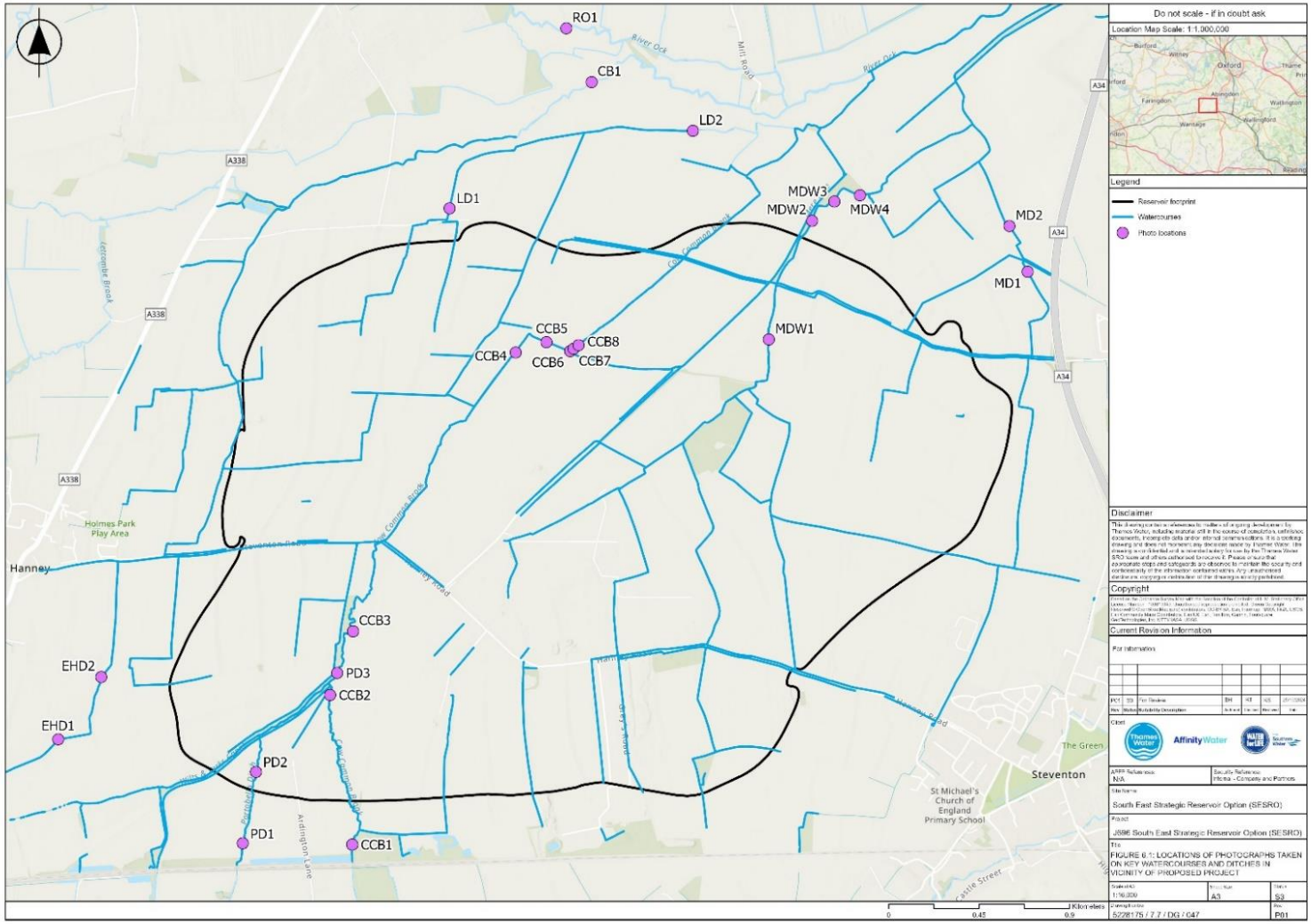

Figure 6-1 Locations of photographs taken on key watercourses and ditches in the vicinity of the proposed Project

6.2.13 The Nationally Scarce[28] beetle *Agabus biguttatus* was recorded in Cow Common Brook (by the Environment Agency in 2000) but has not been recorded since. Environment Agency survey in 2022 identified a community of higher conservation value relative to previous surveys, with several higher scoring taxa under the Community Conservation Index (CCI), including the Nationally Scarce *Amphinemura standfussi*.

6.2.14 Data for the Portobello ditch (and other ditches within the water body catchment) is very limited. Data from eDNA surveys on Portobello ditch indicates a common assemblage, dominated by true flies.

6.2.15 Data were available for the macroinvertebrate communities in the Cow Common Brook, Portobello Ditch, Old Canal and Orchard Farm Ditch for a single survey in spring 2024. These data also indicate a macroinvertebrate community that is typical of lowland ditch habitats with a low sensitivity to pollution, a preference for slow flowing water, a low sensitivity to reduced flow and indicative of heavily sedimented to sedimented conditions. No notable species were observed during the spring 2024 surveys.

6.2.16 Limited data are also available for the macrophyte and phytobenthos communities. However, the available data suggest a community which is typical of nutrient enriched waters with a low sensitivity to pollution.

6.2.17 Macroinvertebrate Invasive Non-Native Species (INNS) that have been verified in the Cow Common Brook include the New Zealand mud snail (*Potamopyrgus antipodarum*) and the flatworm *Planaria torva.* An historical review[29] identified several other INNS within the footprint of SESRO but did not attribute these records to any specific watercourse(s). These include Caspian mud shrimp (*Chelicorophium curvispinum*), the freshwater shrimp (*Crangonyx pseudogracilis/floridanus*), zebra mussel (*Dreissena polymorpha*), American signal crayfish (*Pacifastacus leniusculus*).

6.2.18 A number of macrophyte INNS were also identified within the same review, including New Zealand pygmyweed (*Crassula helmsii*), Nuttall's waterweed (*Elodea nuttallii*), Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*), and rhododendron (*Rhododendron ponticum*). As noted above, these records could not be attributed to specific watercourse(s).

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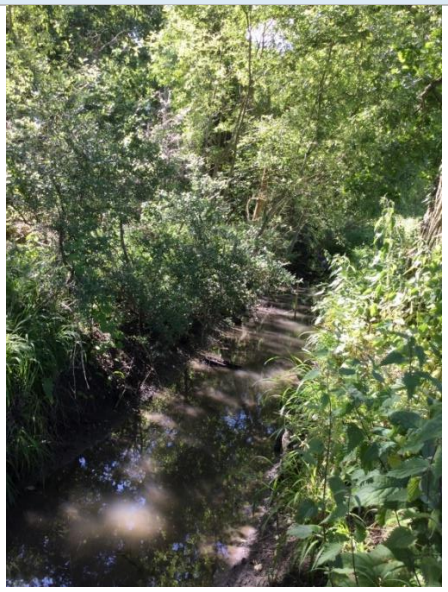
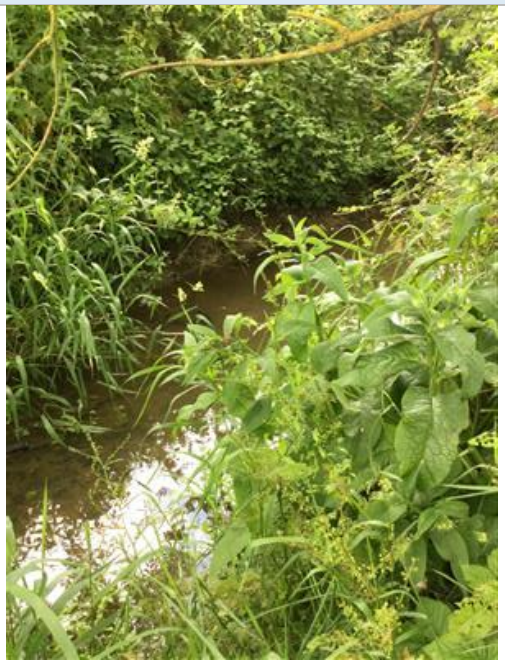
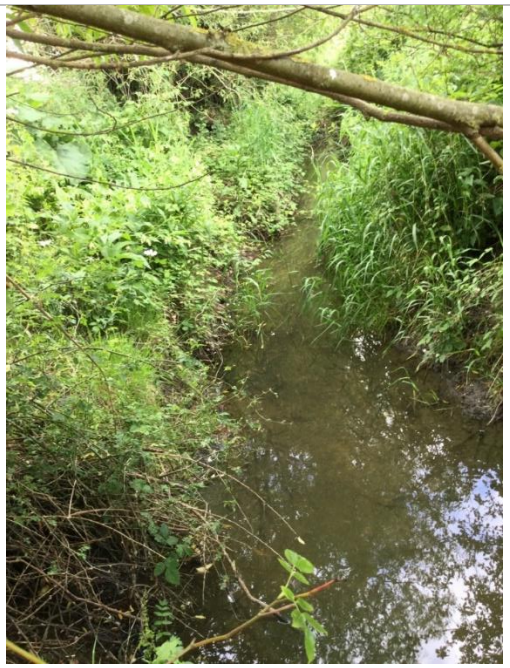
[28] Nationally scarce: Taxa which are recorded in 16–100 hectads (10 km squares) (excludes Red listed taxa).
[29] Cascade Consulting (2009) Invasive Species Review. Report on behalf of Thames Water.

Table 6.1 Photos taken at locations along Cow Common Brook and Portobello Ditch during site visits on 17 and 19 June 2024

Site photos – Cow Common Brook	
Photo 1 (CCB1)– NGR SU 43637 91644 – downstream	
Photo 2 (CCB2) – NGR SU 43528 92389 – downstream	

Site photos – Cow Common Brook	
Photo 3 (CCB3)– NGR SU 43641 92706 – downstream	
Photo 4 (CCB4) – NGR SU 44451 94094 – downstream	

Site photos – Cow Common Brook	
Photo 5 (CCB5) – NGR SU 44605 94146 – downstream	
Photo 6 (CCB6) – NGR SU 44723 94102 – downstream	

Site photos – Cow Common Brook	
Photo 7 (CCB7)– NGR SU 44740 94113 – across	
Photo 8 (CCB8) – NGR SU 44765 94131 – downstream	

Site photos – Portobello Ditch	
Photo 1 (PD1)– NGR SU 43093 91651 – upstream	
Photo 2 (PD2)– NGR SU 43159 92006 – downstream	

Photo 3 (PD3) – NGR SU 43563 92499 – downstream	

East Hanney Ditch

6.2.19 East Hanney Ditch (Table 6.2) is a tributary of the Childrey Brook and runs from just north of the railway line to the confluence with Childrey Brook for a total length of 4.7 km, 3.7 km of which is within the indicative location of SESRO. For its entire course, the ditch lacks any sinuosity and is likely to have been artificially created for agricultural drainage. The ditch possessed little variation in river depth or width. For most of the ditch it maintains a thin strip of mature riparian vegetation down each bank. There are an additional seven manmade agricultural drainage ditches that flow into the East Hanney Ditch for a total length of 4.2 km. East Hanney Ditch forms a relatively large part of the Childrey Brook and Nor Brook at Common Barn water body but it is not recognised itself as a WFD water body and therefore does not form a part of the stated 4.042 km length of this particular water body. It would need to be diverted as part of the works and the new alignment would run adjacent to the Cow Common Brook realignment along the western side of the reservoir.

6.2.20 Baseline ecology data for the East Hanney Ditch is very limited. There has not been any Environment Agency monitoring since 2000, and contemporary available data is limited to eDNA surveys (three survey locations and eight surveys in total) which suggest no notable macroinvertebrate or fish communities present. Fish eDNA recorded is restricted to 3- and 9/10-spined stickleback, stone loach and minnow. The only notable species recorded in East Hanney Ditch (entire record period) is the beetle *Agabus (Ilybius) chalconatus* which has a Conservation Score of 7 (Notable, but not Red Data Book status) under the CCI metric, recorded in 1999 from Environment Agency monitoring data. The absence of this species in data from the last 20 years may reflect the

limited monitoring. However, eDNA samples collected from East Hanney Ditch also did not record the species (noting that this species was not specifically targeted via the eDNA surveys).

Table 6.2 Photos taken at locations on East Hanney Ditch within the Project boundary during site visits on 8 and 9 November 2021

Site photos	
Photo 1 (EHD1) – NGR SU 42174 92168 – downstream	
Photo 2 (EHD2)- NGR SU 42389 92479 – downstream	

Childrey Brook and River Ock

6.2.21 The River Ock (Table 6.3) is a tributary of the River Thames, with the confluence located in Abingdon, Oxfordshire, downstream of the study area. Childrey Brook (Table 6.3) joins the River Ock just upstream of Marcham Mill to the north of the main proposed Project area. The sections of Childrey Brook and the River Ock within the indicative location of SESRO have retained much of their sinuosity, and thus width and depth variability, although the section of the Ock between Marcham Mill and the A34 has been straightened since the 1888–1913 OS map (National Library of Scotland, 2022). The section of the Ock either side of the A34 appears to have been straightened to power New Cut Mill sometime prior to the late 1800s. The Ock and Childrey Brook may, therefore, overall provide a

greater geomorphic and ecological value than other watercourses impacted by the Project. The River Ock is approximately 10 m wide and Childrey Brook approximately 5 m wide at the bridge crossings at the interface with the public right of way upstream of Marcham Mill.

6.2.22 The available baseline ecology data suggests that the fish community of the Childrey Brook consists of species with a wide range of tolerances (low to high) to environmental disturbance and includes species such as 3-spined stickleback, gudgeon, minnow, pike, roach, stone loach, and the notable species bullhead and brown/sea trout. The macroinvertebrate community within the Childrey Brook appears to be moderately sensitive to reduced flows with available data suggesting impacts related to reduced flows and fine sediment. Data for both the macrophyte and diatom communities suggest communities that prefer nutrient enriched waters and are not sensitive to organic pollution.

6.2.23 In comparison, the River Ock appears to support a diverse fish community including lithophilic (coarse substrate spawning) species, such as the notable species brown/sea trout a as well as dace (*Leuciscus leuciscus*) and other species that are considered to have a low tolerance to disturbance. The macroinvertebrate data available suggests a macroinvertebrate community that is sensitive to organic pollution, has a moderate sensitivity to reduced flow and is unimpaired by flow pressures or fine sediments. Data for the macrophyte community suggest a community with a preference for nutrient enriched waters and low sensitivity to organic pollution.

6.2.24 One notable macroinvertebrate species has historically been recorded in Childrey Brook, the caddisfly *Brachycentrus subnubilus*. A supplementary survey (Killeen, 2001)[30] reported in Thames Water's Rare Mollusc and Mussel Survey (2009)[31] also found fine-lined pea mussel (*Pisidium tenuilineatum*) in 1998. Native white clawed crayfish were known to be historically present at Marcham Mill. A small population estimated at 148 individuals was found at this site in 1998, and one individual was recorded in 2000, but a resurvey in 2004 found only dead natives (thought to be caused by a pollution incident). The Thames Water specialist Native Crayfish Baseline Survey (2009)[32] resurveyed these sites in 2006 to confirm if white clawed crayfish populations had recovered, but none were found and the report concluded that white clawed crayfish are no longer present within Childrey Brook. The only macroinvertebrate INNS recorded in any of the datasets is New Zealand mud snail and the freshwater shrimp *Crangonyx pseudogracilis/floridanus,* with the

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[30] Killeen, I.J. (2001) An assessment of freshwater mollusca with particular reference to species of conservation value. Supporting document for Abingdon Reservoir Environmental Statement. Prepared for Thames Water.
[31] Malacological Services and Cascade Consultancy (2009) Rare Mollusc and Mussel Survey. Report on behalf of Thames Water.
[32] Applied Ecology Ltd and Cascade Consulting, 2009, Native Crayfish Baseline Survey 2006-2008. Report on behalf of Thames Water.

Thames Water Native Crayfish Baseline Survey (2009)[29] also identifying small numbers of American signal crayfish in 2006.

6.2.25 Thirteen notable macroinvertebrate species have been recorded in the River Ock over the entire record period, including fine-lined pea mussel, river orb mussel *Sphaerium rivicola*, the true bug *Mesovelia furcata*, five beetle species (*Gyrinus urinator, Anacaena bipustulata, Hydraena testacea, Riolus subviolaceus,* and *Notaris scirpi*), three caddisfly species (*Brachycentrus subnubilus*, *Potamophylax rotundipennis*, and *Ceraclea albimacula*), and two true flies (*Simulium angustitarse* and *Oxycera pardalina*). Thames Water's Rare Mollusc and Mussel Survey (2009)[31] suggested that the River Ock population of fine-lined pea mussel is of national importance.

6.2.26 The Invasive Species Review (2009) recorded three INNS within the Ock catchment: the freshwater shrimp *Crangonyx pseudogracilis*, American signal crayfish, and New Zealand mud snail. However, the location of the species record(s) was unspecified, so it is unknown specifically which watercourses in the lower Ock catchment these records relate to.

6.2.27 The INNS Canadian waterweed (*Elodea canadensis*), Himalayan balsam, Nuttall's waterweed, Japanese knotweed and giant hogweed (*Heracleum mantegazzianum*) have all been recorded in the water bodies as well.

Table 6.3 Photos taken at locations on Childrey Brook and the River Ock during site visits on 8 and 9 November 2021

Site photos	
Photo 1 (CB1) – NGR SU 44829 95441 on Childrey Brook – upstream	
Photo 2 (RO1)– NGR SU 44703 95709 on the River Ock – downstream	

Mere Dyke and other notable watercourse and ditches

6.2.28 The Mere Dyke (Table 6.4) forms the lower part of a system of drainage ditches draining into the River Ock and would form part of the new Mere Dyke Diversion. The existing Mere Dyke is classified as a Main River north of Kiln Lane. All the channels in the system are straighten and probably unnaturally modified to facilitate local drainage evidenced by the unnatural planform, including the section that is Main River. Therefore, they are likely to provide limited aquatic value. Bank heights range from 1–2 m.

6.2.29 Landmead Ditch (Table 6.4) has a similarly straightened planform and is likely to be in a similar poor condition. The same applies to Sandford Brook and Marcham Brook in the area in the indicative location of SESRO, though they have a more natural and sinuous planform upstream of the A415 and outside of the proposed Project footprint where a Special Site of Scientific Interest (SSSI) is located.

6.2.30 Data were limited for the Mere Dyke (four survey locations with 11 surveys in total) and many of the notable ditches within the study area. Excluding Mere Dyke (as well as Portobello Ditch and East Hanney Ditch, previously summarised), fish eDNA was often absent at ditch locations surveyed, with positive eDNA records (such as those associated with Steventon Ditch and Orchard Farm ditch) restricted to minor species such as 3- and 9/10-spined stickleback. This suggest that the ditches within the proposed Project footprint do not typically support significant fish populations. Mere Dyke records were similar, but variable in both time and space (with some negative records), and species recorded in addition to those present in the wider ditch networks restricted to bullhead, pike and ruffe (*Gymnocephalus cernua*).

6.2.31 Data were also limited for the macroinvertebrate communities. Surveys completed in 2006 found that most of the ditches (Portobello Ditch, Landmead Ditch, Mere Dyke, Oday Ditches and many feeder ditches) contained similar assemblages, dominated by beetles and molluscs, but with no notable species. The most recent data (spring 2024) also suggest typical lowland ditch communities with a low sensitivity to water quality changes and a preference for slow flowing water. Similarly, there are limited macrophyte data for the ditch systems. Walkovers completed in 2021 suggest that Portobello Ditch and Mere Dyke have limited macrophyte interest, with extensive fool's-watercress (*Helosciadium nodiflorum*) dominant in un-shaded reaches.

Table 6.4 Photos taken at locations along Mere Dyke and other notable ditches within the Project boundary during site visits on 17th and 19th June 2024

Site photos	
Photo 1 (MDW1) – Mere Dyke West NGR SU 45712 94159 – downstream	
Photo 2 (MDW2) – Mere Dyke West NGR SU 45927 94750 – downstream	

Site photos	
Photo 3 (MDW3) – Mere Dyke West SU 46038 94846 – downstream	
Photo 4 (MDW4) – Mere Dyke West SU 46165 94877 – downstream	

Site photos	
Photo 5 (MD1) – Mere Dyke SU 47000 94497 – upstream	
Photo 6 (MD2) – Mere Dyke SU 46909 94724 – downstream	

Site photos	
Photo 7 (LD1) – Landmead Ditch NGR SU 44123 94812 – downstream	
Photo 8 (LD2) – Landmead Ditch NGR SU 45334 95198 – downstream	

General description of the River Thames water environment

6.2.32 The River Thames at the location near to the proposed Project, has retained some of its sinuosity although the river is maintained for navigation, so the channel and flows within it are managed actively to maintain a minimum navigable depth. There are reasonable widths of riparian and marginal zones of the river. Typical photos are shown in Table 6.5. In this area, the channel is approximately 50–60 m wide. Just downstream of the proposed intake/outfall structure site the River Thames splits for a short distance some of the water going down Culham Cut on which there is a lock used to navigate past weirs on the main Thames. These weirs help retain water levels for navigation which also impacts on the geomorphology of the Thames upstream, ponding the river and thus leading to changes in deposition patterns. Just north of the village of Sutton Courtenay and south of the Culham Lock is an important local feature known as Sutton Pools.

6.2.33 Extensive ecological data are available for the reaches of the River Thames. This includes data collected by the Environment Agency and targeted surveys from the SRO monitoring programme. The River Thames supports a diverse fish community. The available data suggests species assemblages were primarily composed of coarse species; roach and bleak (*Alburnus alburnus*) being present in high abundance. These species are eurytopic (tolerant of nutrient rich conditions), though typically most commonly associated with slow flowing, enriched waters, and are considered to be highly tolerant to environmental disturbance. The habitats within the weir pools are considered important for the fish community as the weir pools and bypass channels provide some habitat heterogeneity. Similarly, the marginal habitats and backwaters are considered to support the juvenile life stages of the coarse fish which are sensitive to high flow conditions in summer. INNS fish have also been recorded in the River Thames. Common carp (*Cyprinus* sp.) varieties have been recorded in the River Thames, typically at low abundance, as have very low numbers of sunbleak (*Leucaspius delineatus*) and zander (*Sander lucioperca*).

6.2.34 Broadly, the invertebrate communities inhabiting the River Thames are indicative of good water quality, sedimented to heavily sedimented bed conditions and exhibit a low to moderate sensitivity to flow reduction. The conservation value of the River Thames macroinvertebrate community is variable but is typically much higher than the watercourses within the Ock catchment.

6.2.35 INNS of macroinvertebrate are common in the River Thames including New Zealand mud snail (*Potamopyrgus antipodarum*), zebra (*Dreissena polymorpha*), and quagga (*Dreissena rostiformis bugensis*) mussels, Asian clam (*Corbicula fluminea*), Caspian mud shrimp (*Chelicorophium curvispinum*), freshwater shrimp (*Crangonyx pseudogracilis*/ *floridanus*), demon shrimp (*Dikerogammarus haemobaphes*) and signal crayfish (*Pacifastacus leniusculus*).

6.2.36 The macrophyte communities of the River Thames are typical of large base-rich, lowland rivers, and are indicative of communities which prefer nutrient enriched conditions. Macrophyte INNS are also common in the River Thames, especially Nuttal's waterweed (*Elodea nuttallii*).

Table 6.5 Photos taken at locations on River Thames during site visit on 9 November 2021

Site photos	
Photo 1 – Typical reach photo – upstream	
Photo 2 – Typical reach photo – downstream	

6.3 Designated Sites

6.3.1 There are no statutory designated sites within the proposed Project area, although the whole local area is a nitrate vulnerable zone, a drinking water safeguard zone (surface water) and most of the area east of the A34 is a Drinking Water Protected Area (Surface Water). The proposed Project is located along the edge of the Impact Risk Zones (IRZ) for three different Sites of Special Scientific Interest (SSSIs) which are all to the north of the proposed Project area as well as being to the north of the River Ock. As a result, these sites are unlikely to be hydrologically connected to the proposed Project area. These are Barrow Farm Fen SSSI which is upstream of the proposed Project area on Sandford Brook, Frilford Heath Ponds and Fens SSSI which is upstream on Marcham Brook, and Culham Brake SSSI which is adjacent to the River Thames. The Cuttings and Hutchins Copse Local Wildlife Site is

within/immediately adjacent to infrastructure associated with the Proposed Project and includes a series of ponds within the non-statutory designation.

6.3.2 To the north of the site near Dry Sandford there is the Cothill Fen Special Area of Conservation (SAC). Further downstream on the River Thames is the Little Wittenham SAC next to Little Wittenham. These designated sites are not considered as part of the WFD assessment and impacts have been ruled out in the SESRO Gate 3 Habitats Regulations Assessment.[33]

6.4 Programme of Measures

6.4.1 A Stage 2 Scoping assessment has been undertaken to determine if the PoM for the Thames River Basin District have the potential to be prevented by the proposed Project. This forms the basis for compliance with Test B of the WFD. Any specific measures relating to the water bodies scoped into this assessment were requested from the Environment Agency. However, only the Mitigation Measures for HMWBs were received (see section 6.6).

6.4.2 The Thames RBD PoM were reviewed and those which were related to specific Management and Operational catchments outside of the ZoI of this proposed Project were excluded. Therefore, this Stage 2 Scoping assessment was completed on those reported for the Gloucestershire and Vale Management catchment and those reported to be applicable to 'Various'[34] Management catchments and the Ock and 'Various' Operational catchments. In total, 99 measures were included in the Stage 2 Scoping assessment which is provided in detail in Appendix A.1 and is summarised below.

6.4.3 Of the 99 measures, 69 were scoped out of further assessment as they were not directly related to the activities being undertaken as part of the proposed Project. Although the measures are not directly related to the activities associated with the proposes Project, there is potential for the proposed Project to influence the implementation of measures at future stages. A few examples of these measures were:

- Catchment farming schemes and diffuse water quality measures
- Sewage treatment
- Locally funded action groups
- Measures for a specific water body outside of the ZoI
- Maritime or coastal Mitigation Measures
- Measures to restore specific habitats which were not present within the ZoI

6.4.4 Thirty measures were scoped out as the proposed Project supported the implementation of the measures, therefore there was no potential for the

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[33] Thames Water, 2024, SESRO, Gate 3: Supporting Document 4 Habitats Regulations Assessment.

[34] 'Various' is used by the environment Agency to outline that more than one catchment is included but it does not outline specifically which catchments are included.

proposed Project to prevent the measures and was therefore considered to pass Test B. Some examples of these measures include:

- Improvement in habitat/habitat restoration
- Sustainable abstraction management
- Climate change adaptation

6.4.5 As all measures have been scoped out of further assessment, they are not considered further in this report. However, the proposed Project could inherently support in the implementation of some of these measures based on the Interim Landscape and Environment Master Plan,[35] such as removal of land out of agricultural production to support in the reduction of water quality issues associated with diffuse pollution.

6.5 Project activities

Introduction

6.5.1 The proposed Project activities have been outlined based on the Interim Landscape and Environment Master Plan[36] and the construction programme which is summarised in Table 6.6.

6.5.2 The Section also outlines the mitigation which has been embedded into the design in the form of as was outlined in the EIA Scoping report (Table 6.12 and Section 7.8). This mitigation has been used to inform the scoping decision set out below.

6.5.3 The proposed Project activities are detailed in the section below and summarised in Table 6.7 with the associated WFD water bodies, receptors and the mechanisms of impact. The mechanisms of impact have also been identified within the detailed impact assessment spreadsheets (Appendix B). The activities identified are those that could have a direct impact on the water body. Activities such as the new WTWs in the proposed Project will not discharge into a potential water body and thus has not been included in this assessment.

6.5.4 Each mechanism of impact has the potential to impact on multiple WFD elements as outlined in Table 4.1 within the Methodology section of this report.

6.5.5 At this stage of the assessment, all permanent Project activities are scoped into the Impact assessment. Construction activities which have the potential to cause permanent impacts have been scoped in. However, where construction activities are anticipated to have temporary impacts when mitigation measures have been considered (i.e. less than one RBMP Cycle of 6 year) have been scoped out.

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[35] *Thames Water, 2024, SESRO Public Consultation, Technical brochure June 2024.*
[36] *Thames Water, 2024, SESRO Public Consultation, Technical brochure June 2024.*

Construction

6.5.6 The proposed works for SESRO currently involves an 8-year construction programme and then an additional 2 years to fill, between 2029 and 2038 (Table 6.6). Five overall construction activities have been identified as being key activities in relation to WFD compliance due to their potential to change the water environment. These activities are listed as A to D in Table 6.6 with additional details outlined below.

Site wide activities

6.5.7 Site wide construction activities could include vegetation clearance, earthworks, dewatering, access roads and haulage. These activities are likely to occur for the majority of the construction programme and will occur across the site at different times.

6.5.8 Several INNS have been recorded within the River Thames. Any new watercourse habitat created risks becoming available to INNS to colonise. In particular, plant species like New Zealand Pygmyweed and Himalayan Balsam can grow both terrestrially and aquatically and have local records within the Ock catchment. Terrestrial species like Japanese knotweed are also associated with the railway line to the south. All these species are also known to spread easily through fragments and seeds. The most notable risk to INNS distribution is through construction activities (intake/outfall structure). It is noted that INNS is not considered as a biological element for WFD classification. However, it is widely acknowledged that INNS can have a detrimental effect on the community structure of aquatic communities, could be a reason for the biology not achieving GES and result in hydromorphological changes/damage that can affect our ability to measure the effect of other pressures such as nutrients and sediment.

Embedded mitigation

6.5.9 It is assumed that all activities will be undertaken in line with good practice measures during construction of the reservoir and the associated works. Works would be undertaken in line with the most up to date guidance available at the time of construction but should follow requirements set out within relevant PPGs and GPPs (GPP1 General Guide to Prevention of Pollution;[37] GPP5 Works and maintenance in or near water;[38] GPP21 pollution incident response planning;[39] PPG6 working at construction and demolition sites;[40] GPP3 use and design of oil

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[37] *NRW/NIEA/SEPA, 2020, Understanding your environmental responsibilities – good environmental practices GPP 1. A basic introduction to pollution prevention, with signposts to other PPGs and publications.*
[38] *NRW/NIEA/SEPA, 2018, Works and maintenance in or near water: GPP 5.*
[39] *NRW/NIEA/SEPA, 2017, Pollution incident response planning: GPP 21.*
[40] *EA/NIEA/SEPA, 2012, Working at construction and demolition sites: PPG 6.*

separators in surface water drainage systems.[41]). These measures will be included in a Water Quality Management Plan secured through the Environmental Statement and DCO requirements.

6.5.10 Invasive and Non-Native Species (INNS) management of the project will be managed through a comprehensive INNS Biosecurity Plan (as outlined within the EIS Scoping Report (Table 6.12)) which will need to be developed at construction and operational phases of the Project and will be secured through the Environmental Statement and DCO requirements. **With this mitigation in place, it is anticipated that impacts to INNS are scoped out of any further assessment.**

Site mobilisation

6.5.11 The initial site mobilisation and enabling works (activity A) will include securing the site, compound construction and laydown, haul road installation and services diversions.

Embedded mitigation

6.5.12 Mitigation will be in line with that outlined for the site wide construction activities. If undertaken appropriately, there is very limited potential for these activities to have a permanent impact (longer than a single RBMP Cycle of 6 years) on WFD status of any water bodies within the ZoI, **the Site mobilisation and enabling works has been scoped out of any further assessment.**

Construction of environmental mitigation

6.5.13 The environmental mitigation works (activity B) consists of two parts: ecological mitigation (activity B1) and watercourse diversion/realignments (activity B2), which are part of the mitigation embedded into the design and construction. The ecological mitigation (B1) will consist of preparation of habitats and translocation of badger, water voles, Great Crested Newts, Reptiles and Bats. **As the Ecological Mitigation (B1) works are unlikely to impact on the water environment, the activity has been scoped out of any further assessment.**

6.5.14 The watercourse diversions and realignments (activity B2) consist of the initial realignments of the main watercourses across the proposed Project site: the Cow Common Brook Diversion and Mere Dyke Diversion along with the diverted East Hanney Ditch (which would have to be undertaken first).

Embedded Mitigation

6.5.15 Surface water management is an embedded mitigation measure required to ensure that all surface water features are suitably managed throughout

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[41] *NRW/NIEA/SEPA, 2022, Use and design of oil separators in surface water drainage systems: GPP 3.*

construction of the proposed Project. The EIA Scoping report (Table 6.12) refers to the phasing of works associated with the construction of floodplains storage and the watercourse diversions and the requirement to complete these activities prior to general construction of the proposed Project. This is required to mitigate impacts to flood risk as well as ecology and hydromorphology. This WFD assessment has assumed that these measures will be captured within a Surface Water Management Plan which will include the implementation of settlement ponds to manage sediment runoff from the site as well as a plan to manage surface water flood risk.

6.5.16 A Surface Water Management Plan should be developed and agreed with regulatory authorities with the construction phase of the proposed Project to ensure that the diverted watercourses (activity B2) can evolve rapidly following construction from a geomorphological and ecological perspective. It is vitally important that the diversions once fully constructed are left to evolve and not impacted by further construction activities across the main reservoir area. Access points over these diversions will need to be controlled and limited in number and measures put in place to control runoff.

6.5.17 The new watercourse would be constructed in the dry, as much as possible, to keep the existing habitat functioning while the new channels are constructed off-line away from the existing habitat. Flow would be directed into the new diversion once the channel construction is fully complete, and suitable habitat has been created. This could be undertaken by connecting the new watercourses at the upstream ends to the existing flowing channels and then installing clay plugs at the upstream limits of the existing channels to divert the flows fully. Once the old channels are drained down, a clay plug would be installed at the downstream limit.

6.5.18 Fish surveys and translocation would also be undertaken after the channels have been fully plugged (see Table 8.1). Translocation would be targeted at the point the flow is changed between the original watercourses and the watercourse diversion and will consider the key sensitive periods for the baseline fish communities. The exact translocation methodology and receptor sites will need to be discussed with the Environment Agency during subsequent project stages.

6.5.19 It is envisaged, that within two growing seasons the macrophytes and macroinvertebrate communities could evolve to a better status than the existing water bodies providing an improved operational environment. This expert judgement has been based on the undertaking a variety of comparable projects[42]. As a result, it is envisaged that if construction is undertaken through

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[42] A good project example of a comparable ecological recovery is on the restoration of Lukely Brook, Isle of Wight, as part of Southern Water's Water Industry National Environment Programme (WINEP) (2019 to 2024) which has involved extensive monitoring.'

2029, and into early 2030, then by Autumn 2031 the habitats would be expected to be at a status that is improved over the baseline condition when compared to existing watercourse habitats within the Project footprint. The habitats would also be expected to move towards good status.

6.5.20 Monitoring and any maintenance of these watercourses should be undertaken during the remainder of the reservoir construction period as necessary.

6.5.21 The methods for managing surface water have the potential to have permanent impacts on some water bodies within the ZoI. Therefore, this construction activity is carried forward to the impact assessment. **As the construction and phasing of the watercourse realignments and diversions will be key in ensuring no permanent impacts to the WFD status of the water bodies, the Watercourse diversion/realignments activity (B2) is screened in for further assessment.**

Reservoir Construction

6.5.22 The construction of the Reservoir (activity C) is made up of several individual activities (Activities C1-C6). It is anticipated that, once the watercourse diversions and realignments are in place along with the Surface Water Management Plan (as outlined above), the construction of the reservoir will be undertaken with limited potential for permanent (longer than a single RBMP Cycle of 6 years) impacts to the water environment within the Ock and tributaries catchment. This includes the construction of access roads and associated crossings (activity C1) and the construction of the intake/outlet structure on the River Thames (activity C4). It is assumed that the construction activities associated with the intake/outfall structures will require a dry working area which would likely necessitate the use of cofferdams.

Embedded Mitigation

6.5.23 Construction of the reservoir embankments will be undertaken with the toe drain in place to mitigate any potential water quality impacts. This will be in line with best practice measures outlined within the Water Quality Management Plan.

6.5.24 It is noted that the dewatering activities associated with cofferdams within the River Thames would be temporary and considering that best practice design and working methods (e.g. the screening of any pumps used for temporary dewatering and fish rescue, sediment control, water quality treatment, etc.), any impacts on the invertebrate and fish biological Quality Elements would be considered temporary at most. **Activities C1 to C6 associated with the reservoir construction are likely to have short term, localised impacts at worst. As a result, all activities associated with the construction of the reservoir have been scoped out of further assessment.**

Commissioning

6.5.25 The commissioning activities (activity E) consists of final authorisation of the intake/outtake structure and pumping station and the filling of the Reservoir over

a two-year period. The final authorisation of the structures will not impact on WFD status as this process does not consists of any change in the water environment and consists of structural reviews and sign off. The filling of the reservoir will require abstraction from the River Thames which will not exceed the operational abstraction volumes. **As a result, this activity is considered as part of the operation of the proposed Project rather than construction.**

Construction activities summary

6.5.26 One of the construction activities and its associated embedded mitigation measure have been scoped in for further assessment:

- Watercourse diversion/realignments as part of the environmental mitigation works (activity B2) with the implementation of a Surface Water Management Plan.

6.5.27 The potential construction and operational impacts associated with the proposed Project are assessed within Section 7. However, due to the limited detail on construction methods at the time of reporting, construction activities are not assessed within the detailed impact assessment Appendix B. As the construction methods are developed at the next stages of design, there should be consideration as to whether construction can be included in the Detailed Impact Assessment.

Table 6.6 SESRO Preliminary programme

Activity code	Construction Activities	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
A	Site Mobilisation and enabling works		→									
B	Construction of environmental mitigation works (Mar 28–Mar 32)	→										
B1	Ecological mitigation (Mar 28–Sep 30)	→										
B2	Watercourse diversion/realignments (Nov 29–Mar 32)		→									
C	Reservoir (Aug 29–Apr 37)		→									
C1	Road access construction (Aug 29–Mar 31)		→									
C2	Storage ponds and pumping stations (Oct 29–Jul 30)		→									
C3	Embankment (Aug 29–May 36)		→									

Activity code	Construction Activities	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
C4	Intake/outlet (Aug 30–Jul 35)											
C5	New WTW (Nov 29–Apr 37)											
C6	Tunnel (Dec 30–Feb 34)											
D	Commissioning activities (Nov 35–Mar 38)											

Operation

6.5.28 The Interim Landscape and Environment Master Plan[7] has been produced to show the operational design of the proposes Project. Each operational activity is described below.

Watercourse lost (as a result of reservoir footprint)

6.5.29 The footprint of SESRO would lead to the loss of multiple lengths of watercourses and ditches. These will be mitigated for within the Habitat creation and watercourse diversion activities.

Reservoir footprint and associated Cow Common Brook Diversion

6.5.30 A long reach of the Cow Common Brook (part of the Cow Common Brook and Portobello ditch WFD water body) that flows directly through the footprint of the reservoir will be lost as a result of the reservoir footprint. The watercourse will be diverted to the west of the reservoir. It will flow all the way around to the north-west of the proposed Project area and join the Landmead Ditch approximately 1480 m upstream of the current confluence. Further work is needed to determine if this may also require alterations to western parts of the Landmead Ditch itself to accommodate a wider range of flows.

Embedded mitigation

6.5.31 The diverted watercourse would have improved morphological form and functioning when compared to the existing situation as much of the length of the current watercourses have been historically straightened. The new morphological template that would be constructed would be expected to have a greater habitat heterogeneity (i.e. better hydromorphological condition) leading to an improved ecological value. The planform has been developed from using the most natural reach of the watercourse as a template. Gravels could be added to the new channels, where appropriate, to help form new riffle features and translocated from existing watercourses where possible.

6.5.32 Selective planting would also be undertaken to encourage a more rapid establishment of marginal vegetation, but it is anticipated that they would be left to predominantly naturally colonise except for targeted species of local provenance.

6.5.33 The Cow Common Brook Diversion would flow adjacent to the East Hanney Ditch Diversion. The two watercourses would not be connected physically but together would form a mosaic of habitats as the water rises and spreads out across the newly created floodplain which would form part of the floodplain compensation area. Additional, scrapes could be considered as part of this habitat mosaic in future phases of the design.

6.5.34 The proposed reservoir footprint is ~6.6 km^2 (including embankment). It covers approximately 40% of the Mere Dyke catchment (which forms part of the Cow

Common Brook and Portobello Ditch WFD water body, resulting in a significant land use change in the lower part of the catchment/catchment loss. The land use change is seen as a positive as it would remove pressures from diffuse source pollution which exists within these catchments. The existing land use is predominantly agriculture and rural land management, which has been identified as a RNAG in the Cow Common Brook WFD water body.

Reservoir footprint and associated Mere Dyke Diversion

6.5.35 A long reach of the Mere Dyke (part of the Cow Common Brook and Portobello ditch WFD water body) that flows directly through the footprint of the reservoir will be lost as a result of the reservoir footprint. The watercourse will be diverted to the east of the reservoir. It will flow all the way around from the south of the reservoir to the east and then turn north-east to end up in the north-eastern corner of the proposed Project area where it will join the River Ock.

Embedded mitigation

6.5.36 At the point where the Mere Dyke Diversion is connected to the River Ock, habitat improvements are proposed to the River Ock itself to deliver mitigation and compensation for the proposed Project overall. The confluence will be upstream of the New Cut Mill as opposed to downstream of the mill at the present time. An assessment of changes in water volume and capacity will need to be undertaken in this reach at the next stage of the project development.

6.5.37 The Mere Dyke Diversion would have improved morphological form and functioning when compared to the existing situation as much of the length of the current watercourses have been historically straightened. The new morphological template that would be constructed would be expected to have a greater habitat heterogeneity (i.e. better hydromorphological condition) leading to an improved ecological value. This will be as a result of a more natural two staged channel, increased sinuosity, increased diversity in channel dimensions which will in turn increase flow diversity and an increase in the complexity of in channel features such as woody features, pools, riffles, runs and bars.

6.5.38 The Mere Dyke Diversion will also join the River Ock approximately 1.5 km to 2 km upstream from its current confluence. The impact of this on flow will also need further assessment in the next stage of the design process and mitigation should be developed as necessary.

6.5.39 The proposed reservoir footprint is ~6.6 km^2 (including embankment). It covers approximately 40% of the Mere Dyke catchment, resulting in a significant land use change in the lower part of the catchment/catchment loss. The land use change is seen as a positive change in relation to pressures from diffuse source pollution which exists within these catchments. The existing land use is predominantly agriculture and rural land management, which has been identified as a RNAG in the Cow Common Brook WFD water body.

East Hanney Ditch Diversion

6.5.40 A long reach (greater than 50% of the entire length) of the East Hanney Ditch (part of the Cow Common Brook and Portobello ditch WFD water body) will be lost as a result of the reservoir footprint. The watercourse will be diverted to the west of the reservoir and west of its current location. It will be diverted to provide space for the Cow Common Brook Diversion. It will join the Childrey Brook at exactly the same location as the current confluence.

Embedded mitigation

6.5.41 The diverted watercourse would have improved morphological form and functioning when compared to the existing situation as all the length of the current watercourse has been historically straightened. The new morphological template that would be constructed would be expected to have a greater habitat heterogeneity (i.e. better hydromorphological condition) leading to an improved ecological value as a result of the features listed above. The planform has been developed from using a more natural reach of the Cow Common Brook watercourse as a template. Gravels could be added to the new channels, where appropriate, to help form new riffle features and translocated from existing watercourses where possible. Selective planting would also be undertaken to encourage a more rapid establishment of marginal vegetation, but it is anticipated that they would be left to predominantly naturally colonise except for targeted species of local provenance.

6.5.42 The East Hanney Ditch Diversion would flow adjacent to the Cow Common Brook Diversion. The two watercourses would not be connected physically but together would form a mosaic of habitats as the water rises and spreads out across the newly created floodplain which would form part of the floodplain compensation area.

6.5.43 The proposed reservoir footprint is ~6.6 km2 (including embankment). It covers approximately 40% of the East Hanney Ditch catchment. Although there are likely to be some improvements in relation to water quality due to land use change away from agriculture, this is likely to be less significant on East Hanney Ditch as it is a smaller catchment that flows north of the railway line but still possible due to the improvement works on the East Hanney Ditch and changes in the vicinity of the western embankment. The river and wetland mosaic around the East Hanney Ditch diversions would yield continued improvements to the status of ecological Quality Elements and has the potential to lead to some additional improvements in water quality.

New clear span bridges

6.5.44 Clear span bridges have been proposed on WFD water bodies, whether this would be road, or public rights of way crossings. An exception to this principle, at the present stage of the development, is in the following location:

- Cow Common Brook Diversion – The proposed corridor for future canal diversion may require a longer control structure but opportunities to make this clear span bridge should be considered at a future stage of the project. Only when demonstrated that this is not possible should an alternative be considered.

6.5.45 Details around this structure will need to be reviewed through the design process to minimise the impact on the aquatic environment and ensure habitat connectivity.

Embedded mitigation

6.5.46 Each crossing point along a WFD water body should ensure passage for a full range of fish species and have a natural channel bed. The bridge abutments will be set back from the bank top to ensure no requirement for bed or bank protection and negligible impact on high flows.

New box culvert

6.5.47 On non-reportable extents of Water Framework Directive water bodies, it assumed that box culverts, not pipes, would be appropriate.

Embedded mitigation

6.5.48 Each of box culvert should be designed to allow for passage for the full range of fish species. All larger box culverts should have an embedment depth of at least 100 mm of gravels and preferably up to 300 mm. In small culverts where this is not practical to deliver, the bed of the culvert should be at least 100 mm below channel bed level for a natural bed to be left to form. Ecological mitigation would still be necessary for each of these sites to ensure provision for mammal passage.

6.5.49 Further discussion will be required with the regulators around the design of any potential box culverts in the next phase of the design process.

New intake/outfall structure

6.5.50 A new combined intake/outfall structure will be located on either the right (west) or left (east) bank of the River Thames near Culham. It is anticipated to include an outfall weir, control building and associated access.

Embedded mitigation

6.5.51 It is currently assumed that the intake structure would have an array of cylindrical screens sited on a slab submerged on the bed of the river. Whilst this remains to be formally confirmed, the only current options being considered for the river intake are this passive wedge-wire cylinder (PWWC) option, or a Hydrolox screen. Both of which are generally considered to represent Best Available Technologies for the protection of juvenile and larval fish, as well as

eels. The Location of the structure will also be maximised to reduce any risks to water quality.

Abstraction

6.5.52 Water will be abstracted the River Thames at Culham during high flow periods and stored in the reservoir.

Embedded mitigation

6.5.53 Abstractions will be limited to periods of high flows (above Q50) as an embedded mitigation measure to mitigate any impacts on low flow conditions which could impact on ecology, hydromorphology and water quality.

Augmentation

6.5.54 Water would be released back into the River Thames during periods of downstream abstraction demand. This is likely to coincide with periods of low river flows in the River Thames thereby providing resilience during low flow conditions.

Embedded mitigation

6.5.55 An important consideration in this process is the water quality management within the reservoir itself as this could impact the water quality of the receptor at the augmentation location. Mitigation will be implemented to ensure that measures are in place to manage water quality to a suitable level to minimise impacts on the River Thames.

Embedded mitigation - Watercourse realignment

6.5.56 All planned watercourse diversions incorporate design objectives to mitigate for the impacts of physical intervention. In addition, two reaches on the Landmead Ditch and the River Ock have been included within the Landscape and Environmental Masterplan a stand alone project activity which mitigate impacts elsewhere within the proposed Project. The realignments (along their existing course) in the north-eastern corner of the proposed Project area have the direct aim to improve habitat to fulfil BNG requirements. The reaches are both currently straightened and local realignment, to create more sinuous sections of channel, will increase habitat heterogeneity. These realignments have been included as an embedded mitigation measure within the Interim Master Plan.

Embedded mitigation - Habitat creation

6.5.57 As part of the embedded mitigation, when diverting watercourses, surrounding habitats will be created. This will fulfil BNG requirements. Ditches diverted, as a result of the proposed Project, will be mitigated for. It is anticipated that some will be connected, and some may be isolated to maximise habitat diversity. Three ditch typologies have been developed, namely: Conveyance Ditch,

Ecological Ditch and Washland (2-Stage) ditch. The three typologies perform different functions and have been designed to maximise aquatic habitat provision.

6.5.58 The Conveyance Ditch has been designed primarily to convey flow rather than for its biodiversity value. Biodiversity value is likely to be constrained due to the potential requirement for frequent targeted maintenance. The ditch should ideally contain water all year to maximise biodiversity potential, noting that appropriate free board would need to be available to allow the ditch to convey flows during higher return periods.

6.5.59 An Ecological Ditch is designed to both convey flow and provide biodiversity value. The ditch should ideally contain water all year noting that appropriate free board would need to be available to allow the ditch to convey flows during higher return periods. It would also include more in-channel complexity including a berm which would be set to be inundated by summer flows.

6.5.60 A Washland (2-Stage) Ditch incorporates benches above the typical water level. The benches act as floodplains within the overall channel section and are designed to function as lateral wetlands during certain times of the year, providing some of the beneficial natural processes within the ditch environment whilst maintaining the necessary drainage capacity performance.

6.5.61 The ditches will be left to naturally colonise except for targeted planting of species of local provenance. Localised pipe culverts are assumed to be suitable to facilitate required crossing points for ditch and land parcel management purposes.

6.5.62 The diverted and realigned channels will all have improved connectivity with the surrounding floodplain particularly in the floodplain compensation areas enhancing the biodiversity value of the riparian corridor.

6.5.63 Selective woodland planting will be undertaken around the watercourse network across the proposed Project area. An overall mosaic of habitats will be created to balance light and shade to support riparian corridor improvements.

Table 6.7 Operational Project activities and mechanisms of impact for each water body and receptor

Project activity	WFD water body	Watercourse names (where applicable)	Mechanism of impact
Watercourse lost (as a result of reservoir footprint)	Cow Common Brook and Portobello Ditch	Old Canal	Direct loss or alterations to open channel or associated habitats Changes in flow volumes
		Unnamed ordinary watercourse	
	Childrey Brook and Norbrook at Common Barn	Unnamed ordinary watercourse	
Reservoir footprint and associated Cow Common Brook diversion	Cow Common Brook and Portobello Ditch	Cow Common Brook	Direct loss or alterations to open channel or associated habitats Enhancement of existing habitats Changes in flow volumes
		Landmead Ditch	Direct loss or alterations to open channel or associated habitats Changes in flow volumes
		Portobello Ditch	Direct loss or alterations to open channel or associated habitats

Project activity	WFD water body	Watercourse names (where applicable)	Mechanism of impact
			Enhancement of existing habitats
Reservoir footprint and associated Mere Dyke diversion	Cow Common Brook and Portobello Ditch	Mere Dyke West	Direct loss or alterations to open channel or associated habitats Enhancement of existing habitats Changes in flow volumes
		Orchard Farm Ditch	Direct loss or alterations to open channel or associated habitats Enhancement of existing habitats
		Goose Willow Ditch	
		Steventon Ditch West	
East Hanney Ditch diversion	Childrey Brook and Norbrook at Common Barn	East Hanney Ditch	Direct loss or alterations to open channel or associated habitats Enhancement of existing habitats Changes in flow volumes
New clear span bridge	Ock and tributaries (Land Brook confluence to Thames)	River Ock	Shading
	Sandford Brook (source to Ock)	Sandford Brook	
New box culvert	Ock and tributaries (Land Brook	Unnamed Ordinary Watercourses	Direct loss or alterations to open

Project activity	WFD water body	Watercourse names (where applicable)	Mechanism of impact
	confluence to Thames)		channel or associated habitats
	Cow Common Brook and Portobello Ditch	Cow Common Brook	
		Mere Dyke (diversion)	
		Old Canal	
		Orchard Farm Ditch	
		Steventon Ditch West	
		Unnamed Ordinary Watercourses	
	Childrey Brook and Norbrook at Common Barn	East Hanney Ditch	
	Sandford Brook (source to Ock)	Unnamed Ordinary Watercourses (SB1)	
New intake/outfall structure	Thames (Evenlode to Thame)	River Thames	Direct loss or alterations to open channel or associated habitats
Augmentation	Thames (Evenlode to Thame)	River Thames	Changes in flow volume Changes in water quality out falling to the receptor
	Thames Wallingford to Caversham	River Thames	

Project activity	WFD water body	Watercourse names (where applicable)	Mechanism of impact
	Thames (Reading to Cookham)	River Thames	
	Thames (Cookham to Egham)	River Thames	
	Thames (Egham to Teddington)	River Thames	
Abstraction	Thames (Evenlode to Thame)	River Thames	Changes in flow volume
	Thames Wallingford to Caversham	River Thames	
	Thames (Reading to Cookham)	River Thames	
	Thames (Cookham to Egham)	River Thames	
	Thames (Egham to Teddington)	River Thames	
Embedded mitigation - Watercourse realignment	Ock and tributaries (Land Brook confluence to Thames)	River Ock	Direct loss or alterations to open channel or associated habitats Enhancement of existing habitats
	Cow Common Brook and Portobello Ditch	Landmead Ditch	
		Mere Dyke	
Embedded mitigation – Habitat Creation	Ock and tributaries (Land Brook	River Ock	Creation of new habitats

Project activity	WFD water body	Watercourse names (where applicable)	Mechanism of impact
	confluence to Thames)		
	Cow Common Brook and Portobello Ditch	Cow Common Brook	
		Portobello Ditch	
		Mere Dyke	
		Mere Dyke West	
		Orchard Farm Ditch	
		Goose Willow Ditch	
		Steventon Ditch West	
	Childrey Brook and Norbrook at Common Barn	East Hanney Ditch	

6.6 Mitigation Measures for HMWBs

6.6.1 The Mitigation Measures for HMWBs which were screened into this assessment were received from the Environment Agency in June 2024. See Appendix A.2 for detail. The water bodies designated as HMWBs are:

- Thames Wallingford to Caversham – GB106039030331
- Thames (Reading to Cookham) – GB106039023233
- Thames (Cookham to Egham) – GB106039023231
- Thames (Egham to Teddington) – GB106039023232

6.6.2 There are no water bodies within this assessment that are designated as Artificial Water Bodies (AWB).

6.6.3 A Stage 2 Scoping assessment was undertaken to identify which of the Mitigation Measures, if any, have the potential to be prevented by the proposed Project. The detailed assessment is provided in Appendix A.2 and is summarised below.

6.6.4 As the reservoir footprint and associated ancillary infrastructure do not fall within any of these HMWBs, there are no physical alterations which could modify the nature of the channel. These water bodies are only expected to be impacted as a result of the changes in flows resulting from the Project. As a result, none of the Mitigation Measures are likely to be prevented by the Project and all have been scoped out of the impact assessment.

6.7 Outcomes of the Stage 2 Scoping Assessment

6.7.1 This section assesses where the proposed Project design may impact the WFD water bodies within the ZoI. It scopes in those water bodies that will need further assessment and scopes out those that will not be impacted (and therefore where there is no risk of non-compliance with WFD).

6.7.2 Ten (10) WFD surface water bodies were screened into this Stage 2 Scoping assessment. Five (5) water bodies are on the River Thames and five (5) water bodies are tributaries within the River Ock catchment. There were 12 operational project activities which were identified as having the potential to impact on these water bodies (Appendix B). The 12 Project activities as outlined in Table 6.7 were considered to have the potential to cause deterioration or prevention of future objectives. As a result, these activities require further assessment in the Impact Assessment. There were five construction activities identified as part of the Stage 2 Scoping stage. One of these activities was determined to have the potential to cause permanent impacts of the WFD status: Watercourse diversion/realignments. This activity is the only construction activities which is carried through to the Impact Assessment.

6.7.3 One Surface water body: Ginge Brook and Mill Brook (GB106039023660) does not have the potential to be impacted by the Project activities as the footprint does not interact with any watercourses within this water body as the Ginge Brook tributaries flow south of the railway line away from the proposed reservoir. There thus will be no alterations in Ecological or chemical elements as a result of the Proposed project. As a result, this water body has been scoped out of further assessment.

6.7.4 The Stage 2 Scoping assessment has determined that the Project does not have the potential to prevent the attainment of any of the Mitigation Measures associated with the Heavily Modified Water Bodies in the ZoI i.e. the River Thames water bodies as outlined in Section 5.2. It was also determined that the project will not prevent the achievement of any of the PoM associated with the water bodies in this assessment which are outlined within the RBMP. Therefore, the assessment of these two elements have been scoped out of further consideration.

7. Stage 3 Impact Assessment

7.1 Introduction

7.1.1 The impact assessment details how SESRO could potentially impact WFD surface water bodies during construction and operation. This is a preliminary view based on the 2024 Interim Master Plan. The spreadsheet in Appendix B details the full Stage 2 scoping and Stage 3 impact assessment for operational impacts only. Due to the limited detail on construction methods at the time of reporting, construction activities are not assessed within the detailed impact assessment Appendix B. As the construction methods are developed at the next stages of design, there should be consideration as to whether construction can be included in the Detailed Impact Assessment.

7.1.2 The assessment text, along with the more detailed text in Sections 7.1 to 7.2 describes the potential impacts of SESRO on WFD water bodies and assesses overall WFD compliance at a water body level. The assessment has been based on information and data gathered up to this stage in the project development. A confidence rating has been applied to the design and data used to support this WFD assessment as outlined in Table 4.3 .

7.1.3 The assessments are based on the Project activities and embedded mitigation outlined in Section 6.5. They cover both Test A (no deterioration) and Test B (protecting future attainment of GES/GEP) (see Section 4.1). They present the effect of Project activities on WFD Quality Elements, on a permanent basis, using the colour coding described in Section 4.5. Assessments are aggregated based on the WFD principle of “one out, all out” to eventually determine the effect of the project at a water body scale.

7.1.4 Statistics that detail river and ditch length diverted, retained and enhanced (which all are used to assess the change in biodiversity units) are covered in the SESRO Biodiversity Net Gain assessment.[43]

7.1.5 Site visits that were used to inform Gate 3 deliverables and collect baseline data have been undertaken in 2024, but access restrictions have meant that the spatial coverage has not been extensive.

7.2 Outcomes of the Impact Assessment

Construction

7.2.1 Impacts on WFD compliance from the proposed Project during construction could result from surface water management and the watercourse diversion/realignments. As these activities have the potential to cause

[43] *South East Strategic Reservoir Option (SESRO), Gate 3 Biodiversity Net Gain Assessment, October 2024. J696-AJ-A02X-ZZZZ-RP-EN-100040*

permanent impacts on the water environment, they have been considered within this impact assessment.

7.2.2 The two construction activities scoped into the Stage 3 Impact Assessment as outlined in Section 6.7 are unlikely to cause any impacts to the River Thames WFD water bodies due to the location of these activities and distance from the River Thames water bodies. Therefore, these two activities are assessed for the River Ock and Tributaries catchment only.

7.2.3 Construction of the watercourse diversion/realignments has the potential to cause permanent changes to the WFD status of the River Ock and tributaries due to the significant alterations required for the Cow Common Brook Diversion, Mere Dyke Diversion and East Hanney Ditch diversion. There is potential for impacts to biological, physico-chemical and hydromorphological quality elements. The phasing of the diversions is key to ensure that the construction does not have permanent impacts on these Quality Elements. With the mitigation outlined in Section 6.5, it is likely that any impacts will be temporary. This is as a result of the watercourses being left to naturalise once constructed with the Surface Water Management Plan (as outlined in Section 6.5) controlling further works to prevent negative impacts to the new watercourses.

7.2.4 It is anticipated that the mitigation in place outlined in Section 6.5 will result in the water bodies moving towards Good status quicker than the baseline scenario without significant, catchment-wide intervention.

Operation

7.2.5 Impacts from SESRO during operation could occur in a physical sense through the loss of watercourses associated with the footprint of the reservoir and ancillary infrastructure, such as road or track crossings. This will be mitigated against through embedded mitigation (section 6.5) across the proposed Project area via the diversions of various watercourses around the perimeter of the reservoir (including Cow Common Brook diversion, East Hanney Ditch diversion and Mere Dyke diversion) as well as additional channel realignments, such as those on the River Ock and the Landmead Ditch.

7.2.6 In addition, given the size of the proposed Project, the watercourse diversions have the potential to change flow and water quality in downstream River Ock water bodies with potential knock-on impacts or benefits to the hydromorphology and aquatic ecology. In the assessments to date, no changes have been identified that are sufficiently significant as to result in changes to WFD status.

7.2.7 On the River Thames, the potential impacts are related to both the abstraction from this water body and return of water through augmentation and how this may affect downstream WFD water bodies. There will also be a localised impact on the bank of the River Thames at the location of the intake/outfall structure where a short section of river bank habitat will be lost to locate the intake screens and augmentation structure. The change in flow in both abstraction and

augmentation has the potential to change water quality and potentially also hydromorphology and aquatic ecology. The current intake screen design considers Best Available Technology. Furthermore, the expected operation of the intake (when flows are >Q50) will ensure that sweeping flows are sufficient to avoid entrainment of juvenile fish and eggs. In addition, the operation of the intake will be outside of summer months (summer intake occurs during wet / high flow summers but is very unusual) which is outside the main coarse fish spawning period and reduces the risk to fish fry.

Hydromorphology

River Thames

7.2.8 The assessment of the River Thames during operation has focused on the potential impact of abstraction from the River Thames to refill SESRO and releases from the SESRO to augment the River Thames flow. As noted, the abstraction from the River Thames to refill SESRO will be constrained by a (HoF). For SESRO only flows that are in excess of 1,450 Ml/d at Sutton Courtenay (Q_{50} as calculated at Gate 1) and 2,834 Ml/d (based on a 5 day average flow) at Kingston can be abstracted into SESRO. The dual HoF therefore protects the lower flows in the River Thames from abstraction. Releases are made from SESRO to augment low flows and can only occur when SESRO is not abstracting. The exact operating regime for SESRO will be confirmed with the Environment Agency as part of subsequent project stages which will include environmental permit (pre)application discussions.

7.2.9 The 1D Infoworks model predicts that use of SESRO means releases from the reservoir tend to augment the lower part of the flow duration curve (below Q_{70}) while abstraction tends to decrease higher flows (above Q_{40}) when the baseline percentile values are based on the 2045 reference conditions. It should be noted that the assessment identified that climate change will have a notable impact on future baseline flows, especially flows between Q_{10} and Q_{95}, meaning release from SESRO could assist in offsetting some of the future predicted impacts of climate change during low flow conditions.

7.2.10 The proposed Project is most likely to be operated to release water during August to October. Maximum utilisation for release to the Thames occurs during September and October, when the average number of days per month when releases occur is 20. This is based on a climate perturbed stochastic dataset of 1,008 years (selected from a 19,200 year dataset). Abstraction is highly likely to occur in February and March, and progressively becomes less likely in April and May. Abstraction in June, July, August and September is unlikely. Some abstraction could also occur in October, November and December.

7.2.11 While the abstraction activities would reduce the higher flows (above Q_{40}), the proportionate change in flows are small and flows would remain within the range that is considered “normal” for the River Thames (normal range for November to March ranging from 450 Ml/d ~ 6,270 Ml/d). Across the full stochastic dataset considered in this assessment, it is predicted that there will only be a reduction

of ~7% in the occurrence of flows above Q30. As a result, the geomorphological functions performed by higher flows (e.g. ensure connection to floodplain, sediment transport and natural geomorphological change through erosion and deposition) will remain.

7.2.12 From a WFD compliance perspective, the Thames (Evenlode to Thame) surface water body is currently considered compliant with the EFI (as indicated by the hydrological regime 'Supports Good') and is considered to be in surplus when considering Q_{95} flows. As stated previously, the available data suggest that, when operational, augmentation from SESRO would augment low flows including at Q_{95}. Future forecasts suggest that river flows will be lower than they are currently at Q_{95} as a result of climate change. It is possible that the release from SESRO could offset some of the potential impacts of climate change in low flow conditions by augmenting flows in the Thames during summer and early autumn. Thus, at lower flows the patterns of deposition currently experienced on the River Thames will potentially be similar to the existing situation, negating the impacts of climate change.

7.2.13 As flow augmentation would occur, a risk of non-compliance in view of the EFI is unlikely to occur (see Table 7.1). As noted, the Environment Agency uses the EFI to indicate where abstraction, or flow regulation, may start to have an undesirable impact on river habitats and species. The available WRGIS data indicates that the water body is considered as ASB 2, meaning that compliance at Q_{95} requires flows to be within 15% of the naturalised Q_{95} flows. It should be noted that the predicted Q_{95} flows presented in Table 7.1 represent a single scenario that is representative the severe 4-year drought event with notable reservoir drawdown, a short period of spring refill to the reservoir, followed by continued drawdown.

Table 7.1 Summary of the available flow compliance data for the Thames (Evenlode to Thame) surface water body.

Data	Value
ASB Final Score	2
Final Compliance at Recent Actual Q_{95}	Compliant
EFI Q_{95} (Ml/d)	310.7
Natural flows upstream at Q_{95} (Ml/d)	365.5
Recent Actual Q_{95} (Ml/d) (2010-2015 inclusive)	377.4
Predicted Q_{95} (Ml/d)	343.5
Predicted Q_{95} (with climate change) (Ml/d)	328.9

Data	Value
Predicted Q_{95} with SESRO (with climate change) (Ml/d)	390.8
Predicted percentage change in Q_{95} with SESRO (with climate change) (Ml/d)	+19%

Data highlighted in grey were provided by the Environment Agency on 03/07/2024 via a Conditional Licence. (Note the assessment point for the Thames (Evenlode to Thame) is at the Reading Gauging Station and flow data presented is from Sutton Courtenay)

7.2.14 As the distance downstream from SESRO increases, the impacts from abstraction and flow augmentation are likely to reduce as flows are influenced more heavily by tributary inflows and influenced by various structures and their maintenance regimes. As the Thames (Evenlode to Thame) will be WFD compliant in terms of hydromorphological impacts, the downstream Thames WFD water bodies will also be WFD compliant.

7.2.15 The potential changes in the flow regime as a result of the operation of SESRO across the full Flow Duration Curve (FDC) has also been considered (see Figure 7-1). The seasonal nature of the utilisation pattern means releases tend to augment the lower part of the flow duration curve (below Q70) while abstraction tends to decrease higher flows (above Q40) when the baseline percentile values are based on the 2045 reference conditions. The largest change in flow relative to the 2045 baseline is at Q95 and below. The change in flows above Q10 is very small and relatively small when above Q40 (when compared to the flow within the River Thames). Across the full stochastic dataset considered in this assessment, it is predicted that there will only be an average reduction of ~7% in the occurrence of flows above Q30.

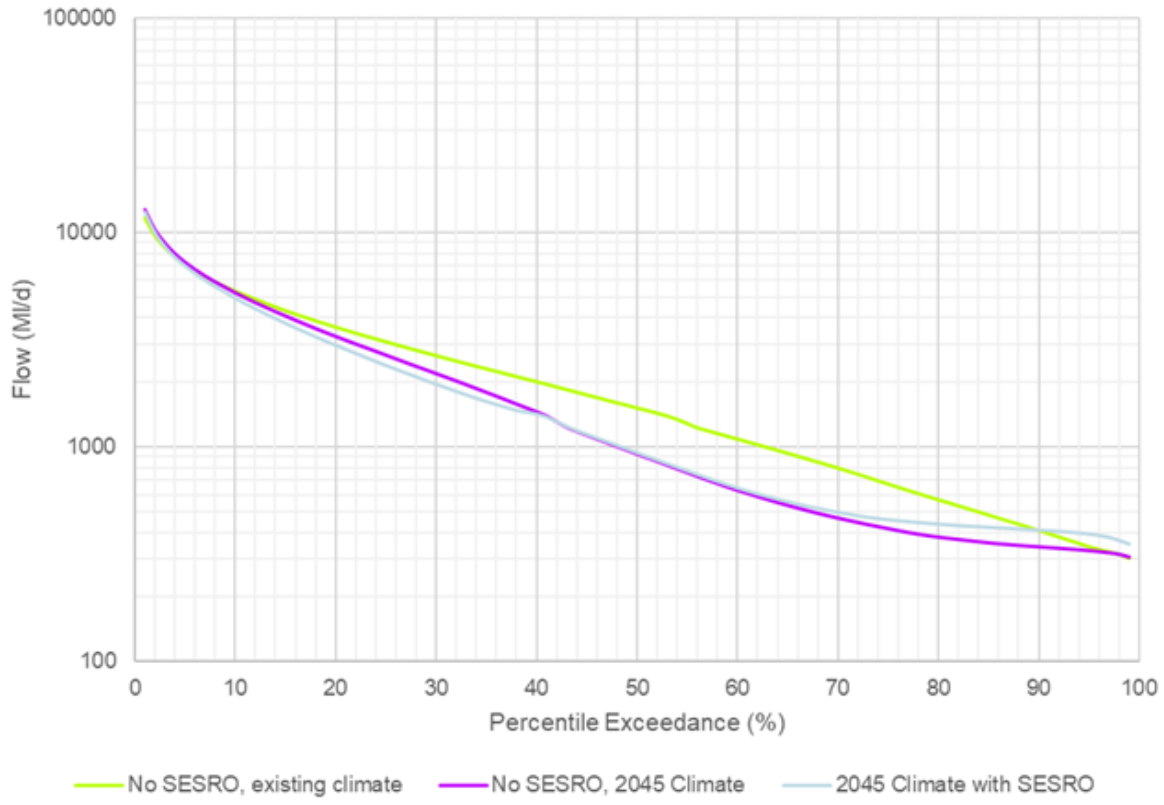

Figure 7-1: Sutton Courtney Flow Duration Curve based on complete stochastic data set

7.2.16 In terms of morphological effects, on the River Thames there will be a loss of natural river bank (albeit a negligible within the context of the water body's total length) as a result of the new intake screens and augmentation structures. This impact will be mitigated for elsewhere in the project as detailed in the Biodiversity Net Gain assessment.[44]

River Ock and Tributaries

7.2.17 During operation, the reservoir footprint is ~6.6 km^2 (including embankment) and reduces the overall River Ock hydrological catchment by ~2.6% from 255 km^2 to 249 km^2. Sub-catchments that are changed include the East Hanney Ditch, the Cow Common Brook and the Mere Dyke.

7.2.18 Considering the embedded mitigation outlined in section 6.5, the watercourses around the reservoir will be left in an improved hydromorphological condition when compared to the existing configuration.

7.2.19 As crossings over Sandford Brook and the River Ock are currently designed as clear span bridges with natural bed and banks, impacts to hydromorphology will be limited to loss of vegetation and associated changes in bank profile as a

[44] *South East Strategic Reservoir Option (SESRO), Gate 3 Biodiversity Net Gain Assessment, October 2024. J696-AJ-A02X-ZZZZ-RP-EN-100040.*

result. Where new box culverts are implemented on non WFD reported watercourses, there is potential for localised impacts to hydromorphology due to loss of bed and bank lengths and changes in the channel widths.

7.2.20 As a result of the reservoir construction the East Hanney Ditch will be moved to the west to accommodate for the Cow Common Brook realignment. This leads to a reduction of around 1.2 km^2 from the East Hanney Ditch catchment which is now added to the Cow Common Brook catchment. This equates to 40% overall reduction in the East Hanney Ditch hydrological sub-catchment (total sub-catchment of approximately 3.1 km^2) and 2.4% reduction in the Childrey Brook catchment to Marcham Mill on Childrey Brook (catchment of around 52 km^2).

7.2.21 For Cow Common Brook the new hydrological sub-catchment has decreased by a total of 1.8 km^2 from 17.5 km^2 to 15.7 km^2. This equates to a reduction in 10.7% in the overall sub-catchment area.

7.2.22 For Mere Dyke the new hydrological catchment has decreased by a total of 3.5 km^2 from 8.5 km^2 to 5.0 km^2. This equates to a reduction in 41% of the overall sub-catchment area.

7.2.23 The risk of non-compliance in view of the EFI is unlikely to occur (see Table 7.2) at the River Ock Assessment Point no. 3 (located at the confluence with the River Thames). The available WRGIS data indicates that the water bodies under consideration are considered as Abstraction Sensitivity Band (ASB) 2, meaning that compliance at Q_{95} requires flows to be within 15% of the naturalised Q_{95} flows. Modelling was completed to understand the proportionate change in catchment as a result of the reservoir footprint and watercourse diversions and the subsequent proportionate change in Q_{95} flows. The outcome of this modelling is presented in Table 7.6 and discussed in the aquatic ecology section below.

7.2.24 The risk of non-compliance with the EFI is also unlikely to occur for the Childrey Brook and Norbrook at Common Barn and Cow Common Brook and Portobello Ditch (see Table 7.2). This is in view of the limited change in Q_{95} flows at the relevant Assessment Points (located at the outflow of the water bodies) and the available data suggesting that the water bodies will remain in surplus when compared to the EFI. While there could be an overall reduction in Q_{95} flows at the outflow of the Cow Common Brook (i.e. at the confluence with the River Ock), most of the water body will be diverted. The watercourse diversions will be designed to consider the reduced catchment to not only ensure the hydromorphological functions are maintained, but that some of these functions (e.g. maintenance and creation of new physical habitat) is enhanced.

7.2.25 From Table 7.2 it is evident that the proportionate change in Q_{95} flows in the Ock catchment are not notable and will not result in a change in compliance with the EFI, particularly as the watercourses are considered to be in surplus when compared to the EFI.

Table 7.2 Summary of the available flow compliance data for the key surface water bodies in the Ock catchment.

	Ock and tributaries (Land Brook confluence to Thames)	Childrey Brook and Norbrook at Common Barn	Cow Common Brook and Portobello Ditch
ASB Final Score	2	2	2
Final Compliance at Recent Actual Q_{95}	Compliant	Compliant	Compliant
EFI Q_{95} (Ml/d)	24.6	5.0	2.6
Natural flows upstream at Q_{95} (Ml/d)	29.0	5.9	3.1
Recent Actual Q_{95} (Ml/d) (2010-2015 inclusive)	36.9	11.6	3.1
Predicted Q_{95} (with climate change) (Ml/d)	26.3	10.7	2.9
Predicted Q_{95} with SESRO (with climate change) (Ml/d)	26.4	10.7	2.7
Predicted percentage change in Q_{95} with SESRO (with climate change) (Ml/d)	0%	0%	−7%

Data highlighted in grey were provided by the Environment Agency on 03/07/2024 via a Conditional Licence.

Water quality

River Thames

7.2.26 Potential changes in water quality during operation in the River Thames that result from SESRO within the modelling system are the result of a number of key processes:

1. differences in water quality between reservoir and river,

2. changes in dilution downstream of the inputs from SESRO, and
3. changes in within river processes that result from changes in river velocity and temperature.

7.2.27 Differences in water quality in the reservoir are, in turn, the result of:

1. mixing and storage of water input from the Thames,
2. processes that reduce concentration within the reservoir by settling and degradation,
3. the timing of inputs to the reservoir in relation to concentrations at the intake, and
4. biological processes in the reservoir that increase chemical concentrations, e.g. algal growth.

7.2.28 It is also important to note that the hydrological conditions from these model runs were selected to represent either drought or operationally average years and not the range of natural hydrological conditions. They are, therefore, likely to result in greater differences between the pre and post SESRO conditions in relation to WFD status than would occur in the long term over more average condition.

7.2.29 Overall, the model predicts an improvement in water quality downstream of the SESRO augmentation point during augmentation (Table 7.3). The only slight declines were transient small changes in BOD, Ammoniacal Nitrogen and Chlorophyll-a with very little change in longer term water quality statistics. Consequently, no change resulted in any water Quality Elements from a WFD perspective. These changes in water quality reduce downstream until they are very small in the lower reaches of the River Thames with the exception of Algae, BOD, Ammoniacal Nitrogen and Nitrite which show a slight increase due to algal growth and reduced natural processing related to increased travel times. However, changes are very small compared to their natural variability and result in no change in WFD classification. Likewise, they have no ecological implications of concern. Model outputs are very similar for both scenarios (4 year severe drawdown and operationally average).

7.2.30

Table 7.3 Summary of modelled changes in water quality in the River Thames as a result of SESRO (4-year severe drawdown event) for all modelled chemical determinands.

Metric	Top (dowsteam of outfall)		Middle Thames (Reading)		Lower Thames (Surbiton)	
	Conc	% Change	Conc	% Change	Conc	% Change
Algae mean (mg/l C)	0.58	−3.90	0.81	4.71	0.65	2.17
Algae 95th percentile (mg/l C)	2.69	−5.78	4.55	0.17	3.43	0.33
BOD 90th percentile (mg/l)	0.82	−0.17	0.76	−0.47	0.76	0.48
Dissolved Oxygen 10th percentile (mg/l)	9.16	0.50	9.05	1.75	9.61	−0.03
Ammoniacal Nitrogen 90th percentile (mg/l)	0.04	−1.42	0.06	0.83	0.02	2.78
Nitrite mean (mg/l N)	0.02	−6.77	0.03	3.17	0.02	0.66
Nitrate mean (mg/l N)	6.95	−5.81	6.19	−2.18	5.44	−0.36
Silicate mean (mg/l SiO_2)	6.38	−9.14	9.26	−3.21	8.90	−0.03
Suspended solids 95th percentile (mg/l)	14.19	−0.13	12.26	2.87	12.94	−1.66
Phosphorus (mg/l P)	0.20	−7.62	0.16	−5.12	0.16	−1.16
Temperature 98th percentile	20.37	−2.45	19.69	−0.45	18.61	0.02

Negative change = improvement apart from Dissolved Oxygen for which it is a decline in water quality.
Key metrics for concentration and percentage change pre to post SESRO (metric in grey for WFD parameters) are shown. Colours show indicative WFD status where applicable (blue = High, Yellow= Moderate). The standard for P is for Soluble Reactive Phosphorus so the comparison made for Total Phosphorus is conservative

River Ock and tributaries

7.2.31 Changes in water quality during operation of SESRO in the Ock catchment before and after SESRO are show in Table 7.4.

Table 7.4 Summary of changes in modelled water quality at key locations in the River Ock catchment as a result of SESRO (2 year operationally average event) for all modelled chemical determinands.

Metric	Bottom of Childrey Brook		Ock above Thames		Bottom of Mere Dyke		Bottom of East Hanney Ditch		Bottom of Cow Common Brook	
	Conc	% Change	Conc	% Change	Conc	% Change	Conc	% Change	Conc	% Change
Algae mean (mg/l C)	0.46	0.07	0.92	−0.16	0.09	−35.20	0.22	−19.36	0.41	−3.16
Algae 95th percentile (mg/l C)	0.54	−0.41	0.48	−0.03	0.12	−41.20	0.32	−15.82	0.60	4.00
BOD 90th percentile (mg/l)	0.90	0.86	2.38	−0.07	0.26	−24.57	0.46	−15.08	0.72	−5.61
Dissolved Oxygen 10th percentile (mg/l)	10.38	0.52	9.85	0.01	11.47	27.67	11.94	2.67	10.29	5.45
Ammoniacal Nitrogen 90th percentile (mg/l)	0.07	0.99	0.25	0.08	0.01	−34.16	0.03	−23.21	0.04	−35.11
Nitrite mean (mg/l N)	0.04	−0.32	0.07	−0.53	0.00	−40.79	0.01	−12.90	0.02	−0.96
Nitrate mean (mg/l N)	6.02	0.61	8.45	0.15	1.20	−30.99	2.62	−15.59	4.60	2.91
Silicate mean (mg/l SiO2)	4.97	1.08	6.92	0.20	1.25	−32.76	2.80	−20.88	4.84	−10.23
Suspended solids 95th percentile (mg/l)	5.48	−7.28	7.65	−4.70	2.31	−30.98	0.00	−100.00	5.79	−20.36
Phosphorus (mg/l P)	0.72	−3.82	0.46	−5.29	0.33	−35.82	0.87	−20.73	1.42	−14.73
Temperature 98th percentile	15.02	0.08	18.93	−0.02	nd	nd	nd	nd	15.84	−1.70

Negative change = improvement apart from Dissolved Oxygen for which it is a decline in water quality. nd = reliable outputs not available Key metrics for concentration and percentage change pre to post SESRO (metric in grey for WFD parameters) are shown. Colours show indicative WFD status where applicable (blue = High, Orange = Poor). The standard for P is for Soluble Reactive Phosphorus so the comparison made for Total Phosphorus is conservative

7.2.32 For each of the modelled model nodes, the impact of the proposed Project is either small or there is an improvement in water quality. Changes in BOD, Ammoniacal Nitrogen and Dissolved Oxygen concentrations in the Childrey Brook are all less than 1% (90th and 10th percentile), whilst mean Total Phosphorus shows are reduction of 3.8%. In the East Hanney Ditch improvements in water quality are 15% for BOD, 23% for Ammoniacal Nitrogen 3% for Dissolved Oxygen, and 21% and Total Phosphorus, whilst at the confluence between the Ock and Thames changes in water quality are small (less than 0.1%).

7.2.33 Water quality in the Mere Dyke Diversion is not directly comparable to the current baseline local since a new channel will be created. If the current downstream point on the Mere Dyke is compared to the new downstream point on the Mere Dyke, then the model indicates a substantial improvement in water quality at the bottom of the catchment (improvements of 24.6% for BOD, 28% for Dissolved Oxygen, 34% for Ammoniacal Nitrogen and 36% for Total Phosphorus. These differences are most likely to be due to changes in residence times in the channel due to changes in flow as well as channel width and length. This sub-catchment requires a higher sweetening flow which may affect the results. The model does not simulate land use change and there are believed to be no significant point sources of pollution in the Mere Dyke catchment, so these changes are attributable to the inputs and within channel processes related to diffuse pollution inputs.

7.2.34 Comparing the channels that drain the Cow Common Brook catchment also shows an improvement in water quality again as a result of changes in channel width, length and flow (improvements of 6% for BOD, 5% for Dissolved Oxygen, 15% for Total Phosphorus and 35% for Ammoniacal Nitrogen; again, most likely to be due to changes in residence times in the channels. There are believed to be no significant point sources of pollution in the Cow Common Brook catchment, so these changes are attributable to the inputs and within channel processes related to diffuse pollution inputs.

Aquatic Ecology

River Thames

7.2.35 During operation, the intake structure will be a permanent structure in the River Thames, the operation of the intake will not present a risk to the fish biological Quality Element in view of the proposed mitigation measures. These mitigation measures include the proposed screening arrangements (see paragraph 6.5.51) which are considered Best Available Technologies and will ensure compliance with legislation (i.e. The Salmon and Freshwater Fisheries Act (SFFA) 197 and The Eels (England and Wales) Regulations 2009) and protection the fish community of the River Thames from operational impacts. The mitigation measures also include those related to abstraction arrangements which will not see abstraction increase by more than 300 Ml/d until a maximum of 1000 Ml/d is reached. Furthermore, the expected operation of the intake (when flows are >Q50) will ensure that sweeping flows are sufficient to avoid

entrainment. In addition, the operation of the intake will be outside of summer months (summer intake occurs but is very unusual) which is outside the main coarse fish spawning period and reduces the risk to fish fry.

7.2.36 Augmentation of water from the reservoir to the River Thames would be via the same conveyance tunnel and shaft as would be used for abstraction. It is assumed that water would pass back to the River Thames via a separate connecting culvert and a concrete stepped cascade structure, which (depending on river water level) will allow for some aeration of the flow whilst avoiding scour. The construction is likely to require a dry working area which would result in the need for some damming and dewatering activities.

7.2.37 It is noted that there is a risk of INNS introduction and spread via operation of SESRO. SESRO will abstract from and augment back into the River Thames, but not the River Ock. Other than screening, it is not proposed that the raw water taken into SESRO will be subject to additional treatment like UV or chlorine. This is because even the smallest issue with the treatment systems would mean that INNS could be transferred which would make the treatment system obsolete. As with construction activities, biosecurity measures for the operational phase are to be outlined in a Biosecurity Management Plan (as outlined in the EIA Scoping report) which will ensure that the risk of introducing new INNS as a result of planned recreational activities remains low.

7.2.38 The potential changes in water quality in the River Thames are presented above (Hydromorphology and in Table 7.1). The potential changes in water quality could occur due to differences in water quality between reservoir and river, changes in dilution downstream of the inputs from SESRO, and changes in within river processes that result from changes in river velocity and temperature. The assessment identifies that the water quality immediately downstream of the SESRO augmentation on the River Thames is predicted to improve. The only slight decline in water quality were transient small changes in BOD, Ammoniacal Nitrogen and Chlorophyll-a with no clear change longer term water quality statistics. These water quality changes do not result in a change in WFD chemical class and are not expected to result in a change in the expected invertebrate, macrophyte or fish communities considered in the classification of the biological Quality Elements. As such, water quality changes as a result of the operation of SESRO is not expected to result in impacts on the biological Quality Elements. In considering these results, it is important to note that the selected scenario periods aimed to represent the range of SESRO operation rather than the range of meteorological and hydrological conditions that would influence WFD compliance. Because the scenario years represent periods of less than average river flow, the outputs are likely to be ‘conservative’ because they do not include wetter years in which SESRO operation would be less and there would be greater dilution of upstream pollution inputs.

7.2.39 The change in flow in the River Thames because of the operation (abstraction and augmentation) of SESRO was assessed by considering the Pywr model outputs at Sutton Courtenay gauging station. This represents the location in the

Pywr model where the greatest change in flow is observed before dissipation of the SESRO influence on flows by downstream flow accretion. The relative change and change in absolute monthly mean flow across the stochastic dataset were considered as well as the change in flow duration statistics across the whole data set. The seasonal nature of the utilisation pattern described above means releases tend to augment the lower part of the flow duration curve (below Q_{70}) while abstraction tends to decrease higher flows (above Q_{40}) when the baseline percentile values are based on the 2045 reference conditions.

7.2.40 While the abstraction activities would reduce the higher flows (above Q_{40}), the proportionate change in flows are small and flows would remain within the range that is considered "normal" for the River Thames. As a result, the ecological functions performed by higher flows (e.g. ensure connection to floodplain, maintenance of nutrient and organic matter exchanges between river and floodplain where connectivity still exists, transport and deposit debris and detritus, maintains low abundances of phytoplankton, etc.) are maintained.

7.2.41 Currently, the Thames (Evenlode to Thame) surface water body is considered compliant with the EFI (i.e. the hydrological regime supports Good) and is in surplus when considering Q_{95} flows. The available data suggest that, when operational, augmentations from SESRO would augment low flows. This is particularly important in view of climate change with the modelled data suggesting that climate change by 2045 reduces all flows between Q_{10} and Q_{95} relative to the existing baseline. The means that the release from SESRO is, to an extent, offsetting the impacts of very low flow conditions by augmenting flows in the Thames during summer and early autumn. Under SESRO operation flows at or below Q_{90} would likely be comparable or are greater than those of the current baseline. An assessment of a severe event from the stochastic dataset provides an indication of the potential impact of SESRO operation during low flow condition. Such an event is considered rare in the stochastic simulation and close to a worst-case low flow condition. The data shows that in the second year of the drought the simulated flows without SESRO are within the 'Exceptionally Low' band however, when SESRO is operating the flows are aligned to those within the 'Normal' band for the summer months

7.2.42 As a result, the Thames (Evenlode to Thame) surface water body would remain compliant with the EFI (based on current Q_{95} and a future predicted Q_{95}, see above (Hydromorphology) and Table 7.1. Furthermore, augmentation of low flows in view of climate change impacts would result in important ecological functions being maintained. This includes for example the maintenance backwater and other refuge habitat for juvenile fish, maintenance of stable flows to support the seasonal patterns in phytoplankton and zooplankton, the maintenance of substrate and bedforms, especially in weir pool habitats, etc.

7.2.43 Maintaining the functionality of flows within the River Thames will ensure that the morphological processes are maintained. The expected aquatic communities are therefore likely to be observed. In view of the WFD classification process, where the expected aquatic communities are observed, the operation of SESRO

will not result in deterioration of the biological Quality Elements (e.g. invertebrates, macrophyte and fish) or prevent objectives from being attained.

7.2.44 The combined effects of flow and water quality changes within the study area, as well as the operation of reservoir water storage and release, have the potential to change primary productivity and food-chain dynamics within the River Thames.

7.2.45 Zooplankton and phytoplankton (although not considered biological elements under the WFD and not monitored for WFD river classification) are an important component of the River Thames aquatic ecosystem due in part to its size and the influence of water level control structures (for navigational purposes) on flows and level. Zooplankton and phytoplankton communities, along with detritus (and to a lesser extent macrophytes), are the predominant food sources for other aquatic communities associated with the River Thames such as fish.

7.2.46 The data for the River Thames shows that chlorophyll *a* (a measure of phytoplankton biomass) follows a consistent annual pattern of increasing in the spring, driven by growth of diatoms, peaking from the end of April to early May, with the size of the peak increasing with distance downstream of the study area. Typically, by June, diatoms and nano-chlorophytes have reduced in number and pico-chlorophytes are dominant and continue to be so through to the autumn, before all phytoplankton drop to low numbers throughout the winter. Diatom and chlorophyll concentrations sometimes produce very large peaks in late August to end September. Cyanobacteria make up only a small proportion of the total phytoplankton biomass and their blooms tend to be sporadic and short-lived but are most common in August. Zooplankton densities recorded suggest that their abundance in the River Thames is highly seasonal with temporal patterns in density tracking phytoplankton growth as discussed below (although there are differences in peak timings).

7.2.47 The combined effects of flow and water quality changes within the River Thames as a result of the operation of SESRO have the potential to change primary productivity and food-chain dynamics within the River Thames. However, with no clear change in longer term water quality statistics and flows remaining largely within what is considered the “normal” range, food-chain dynamics within the River Thames is not expected to be notably affected.

7.2.48 There remains some uncertainty with regards to benefits of augmenting low flows. Flow augmentation can support rivers in which significant environmental and water resource pressures exist. However, not all effects of drought and low flows are adverse for all species all of the time.

7.2.49 High summer flows have been correlated with a reduction in coarse fish recruitment/year class strength in UK rivers;[45] year class strength of roach in the River Ouse, for example, has been negatively correlated with increased augmentation during the period from June to September inclusive. SESRO will release flow outside of drought and very low flow conditions (i.e., during years with a higher baseline summer range) and consequently, could alter the structure of some aquatic communities. A key challenge will be resolving the subjectivity and philosophy of whether a potential change (for example, changes in the relative abundance of different fish species) is considered to be adverse or beneficial, especially where key ecosystem functions are maintained.

7.2.50 This may be the case where existing ecological models is used to predict the expected communities and to inform the WFD status of biological Quality Elements. This includes, for example FCS2 which is used to predict the expected fish community and RICT which is used to predict the expected invertebrate communities. Such models use environmental data such as flow and water quality to predict the expected community.

7.2.51 The applicability of such ecological models and the use of the approach of comparing expected and observed communities may need to be reconsidered in view of the potential climate driven impacts on the River Thames. Ultimately, one has to consider the proportionate change in flows below Q_{95} (i.e. increasing a flow of ~300 Ml/d by 55 Ml/d) in the context of a level-controlled system such as the River Thames. On balance, such a proportional influence is likely to have a negligible effect on the ecology of the Thames in most years, and a beneficial effect in others (e.g. severe drought years).

River Ock and Tributaries

7.2.52 Where required crossings and culverts will be designed to maintain flow and sediment continuity and species permeability which will maintain the overall function and integrity of the associated watercourses during operation. Longitudinal continuity is of particular importance for the fish biological Quality Element. Although migratory species (diadromous fish) are limited in the Ock catchment, fish will still require free movement upstream and downstream to exploit different habitats. The design of the culverts will allow for migration of aquatic organisms and sediment transport.

7.2.53 The potential operational habitat loss is not considered to be significant in extent when considering the embed mitigation measures (see Section 6.5) and will not result in deterioration or prevent WFD objectives for the relevant biological Quality Elements being attained. This is in view of the work undertaken in 2024

[45] *Frear, P.A. and Cowx, I.G., 2003, Factors Affecting Coarse Fish Recruitment. Phase II – Examination and Analysis of Existing Environment Agency Data. Section 4.3. R&D Technical Report W2-048/TR. Swindon, UK: Environment Agency.*

which has shown that mitigation for the loss in length of watercourses and ditches can be achieved across the proposed Project.

7.2.54 Noting that there remains some uncertainty, the available modelled outputs suggest that the primary impact of the proposed Project in the Ock catchment during operation is to change dilution of point source pollution loads because of the reduced river flows. In some watercourse (e.g. the Cow Common Brook), droughts are known to be responsible for low Dissolved oxygen and this could be exacerbated where flows are decreased. Within the reservoir catchment the reductions in flow are broadly matched by the reductions of diffuse pollution since the loss of catchment area affects them equally. As a result, it is assumed that the risk to the biological elements from water quality change is limited (also see Table 7.4).

7.2.55 The change in Q_{95} flows in the watercourses associated with the footprint and diversions is presented below and represent an overall reduction in Q_{95} flows in the Lower Ock that is not detectable in the lower flow simulations (~0%). The catchment reductions and associated Q_{95} reductions as simulated by the River Ock model as summarised in Table 7.5 and Table 7.6, respectively. It should be noted that there are no continuous timeseries of flow or water quality in any of the sub-catchment of the River Ock so it has not be possible to validate the model at this time. It should also be noted that the model simulation is for two years and the Q95 values should be considered in this context. Recommendations for additional data were made at Gate 2. As a result of limited land access, the data required for validation of the models remain limited. If available in future, such data would allow validation or refinement of the model. As part of the environmental mitigation works the Mere Dyke will be diverted along with the diverted East Hanney Ditch. Whilst the catchments upstream of the reservoir will be diverted, there will be a reduction in the overall drainage area to the River Ock as a result of the reservoir footprint. Importantly, this has minimal impact on the flows in the Lower Ock. The watercourse design will also consider the reduced catchment and will ensure that habitats in the diverted watercourse deliver habitat improvements to support a more biologically diverse aquatic community.

Table 7.5 Summary of the catchment reductions associated with the footprint of the reservoir

Catchment	Baseline area (km^2)	Realignment area (km^2)	Hydrological catchment area reduction (%)
East Hanney Ditch	3.1	1.8	−42%
Childrey Brook	52.1	50.9	−2%
Cow Common Brook	17.5	15.7	−10%
Mere Dyke	8.5	5	−41%
River Ock	255.2	248.6	−3%

Table 7.6 Summary of the simulated Q_{95} reductions associated with the watercourse realignment

Catchment	Baseline Q_{95} (Ml/d)	Realignment Q_{95} (Ml/d)	% reduction in Q_{95}
East Hanney Ditch	1.2	1.1	−8%
Childrey Brook	10.7	10.7	0%
Cow Common Brook	2.9	2.7	−7%
Mere Dyke*	1.8	1.3	−30%
River Ock*	26.3	26.4	0%

*The model simulation produces a Q95 value for Mere Dyke of 10.5 Ml/d in the baseline model and 8.2 Ml/d in the realigned model. As stated in paragraph 4.5.20 the model contains instabilities at low flows and, these have been reduced through the application of sweetening flows. Mere Dyke contained a greater number of very small upstream catchments requiring sweetening flows for model stability, and these accumulate to a higher volume relative to other sub-catchments. The values for Mere Dyke stated in the table have been post-processed to remove the additional sweetening flow. This has also been removed from the downstream River Ock flow. As noted in this document, the Q95 values are from a two-year simulation from one stochastic series. As with all statistical calculations, percentile outputs are subject to change if the run is extended, shortened and/or if other replicates are selected for simulation.

7.3 Water body impact assessment summary

7.3.1 A description of the outcome for each WFD water body is provided below and summarised in Figure 7-2 and Appendix B with colour coding outlined in Table 4.2. The latest assessment concludes that with the proposed mitigation all WFD water bodies have the potential to be compliant and therefore should not require derogations in line with Regulation 13(2) and 13(5).

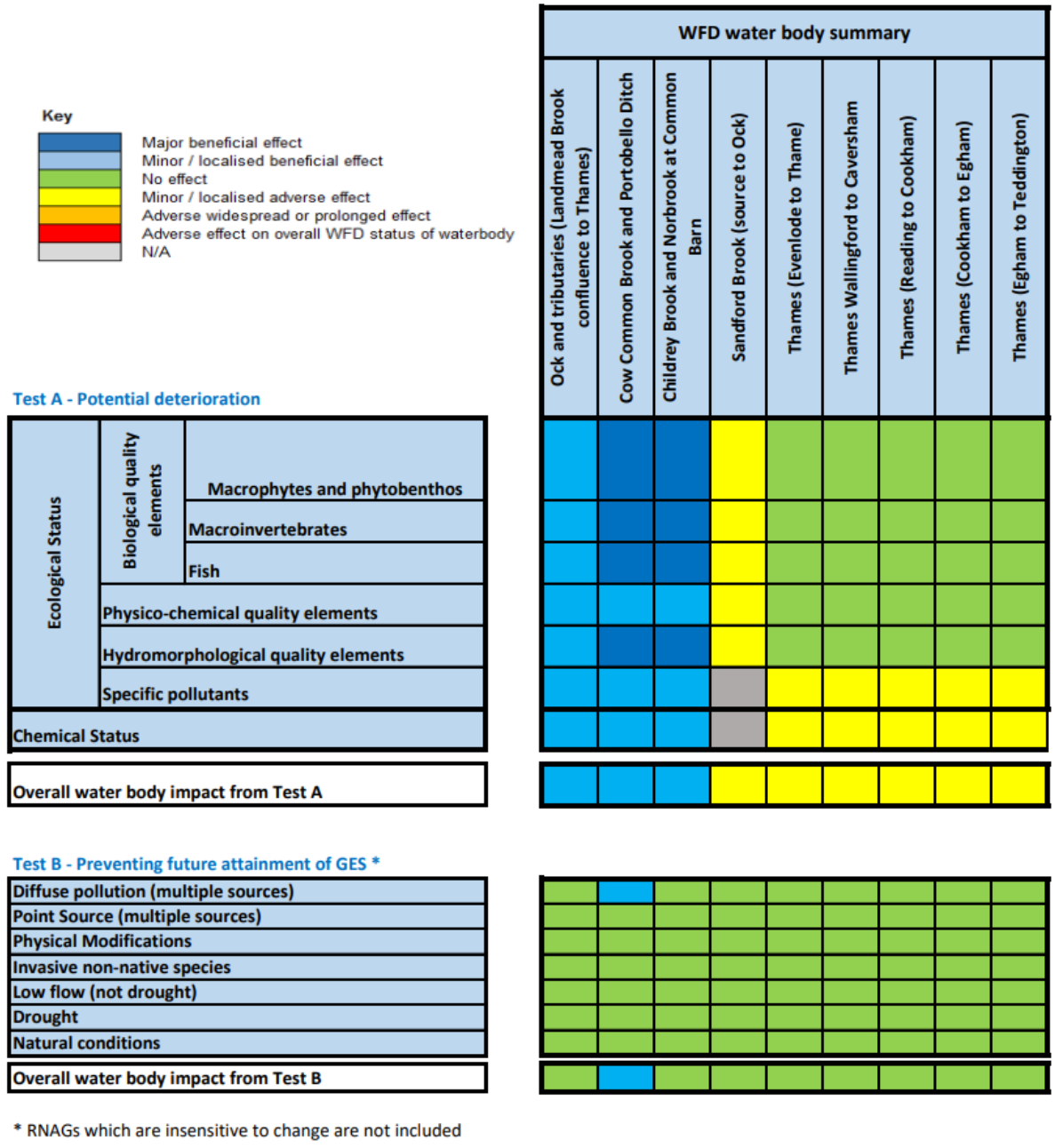

Figure 7-2 Summary of the Stage 3 impact assessment outcomes for existing WFD water bodies

Ock and tributaries (Land Brook confluence to Thames)

7.3.2 Localised adverse effects from the installation of a new culvert on an unnamed ordinary watercourse are balanced by the localised beneficial effects of the enhanced existing habitats and the creation of new habitats along the realigned watercourse.

7.3.3 A cumulative assessment was undertaken based on the potential changes in flows in the upstream the Cow Common Brook and Portobello Ditch and the Childrey Brook and Norbrook at Common Barn WFD water bodies, and the

impact this may have on the Ock and tributaries water body. It was determined that the changes in flows within the Ock were negligible as a result of the upstream changes with no measurable changes anticipated in ecological, hydromorphological or chemical elements at a cumulative scale.

Cow Common Brook and Portobello Ditch

7.3.4 The minor and localised adverse effects on habitats and flow anticipated as a result of the diversion of watercourses due to the reservoir footprint and the installation of new box culverts, are balanced against the embedded mitigation.

7.3.5 The enhancement and creation of habitats embedded as part of the Cow Common Brook and Mere Dyke diversions and watercourse realignments will have a beneficial impact to Quality Elements at the water body scale. While there could be an overall reduction in Q_{95} flows at the outflow of the Cow Common Brook (i.e. at the confluence with the River Ock), most of the water body will be diverted. The watercourse diversions will be designed to consider the reduced catchment to not only ensure the hydromorphological functions are maintained, but that some of these functions (e.g. maintenance and creation of new physical habitat) is enhanced. Additionally, through this habitat creation, a significant proportion of the catchment land use will be taken out of its current agricultural regime. This will have a secondary beneficial effect on the water quality and biological Quality Elements at the water body scale by removing wider pressures on Dissolved Oxygen, Macrophytes and phytobenthos combined, invertebrates and Phosphate associated with agricultural land practices which have been identified as a RNAG for this water body at Cycle 3.

Childrey Brook and Norbrook at Common Barn

7.3.6 Localised adverse effects from the loss and alteration to watercourse length and the installation of two new box culverts, is balanced by the embedded mitigation. The creation and enhancements of new and existing habitats including the East Hanney Ditch Diversion will have a cumulative beneficial effect at the water body scale.

Sandford Brook (source to Ock)

7.3.7 The new clear span bridge will have no measurable effect. Neither activity will affect WFD Quality Elements at the water body scale.

Thames (Evenlode to Thame)

7.3.8 Localised adverse effects are anticipated as a result of the construction of the new intake / outfall structure. The changes in flows and water quality as a result of the operation of the new abstraction and augmentation are anticipated to have no measurable effect on biological Quality Elements or the Hydromorphology Supporting Element. It is not considered that changes in the nature of primary productivity within the River Thames are likely to significantly

affect higher trophic levels relative to the existing baseline. However, there is potential for minor adverse short terms effects on elements as a result of abstraction and augmentation. This should be assessed in more detail at future project stages.

Thames Wallingford to Caversham, Thames (Reading to Cookham), Thames (Cookham to Egham) and Thames (Egham to Teddington)

7.3.9 The changes in flows and water quality as a result of the new abstraction and augmentation are anticipated to have no measurable effect on the River Thames biological Quality Elements or the Hydromorphology Supporting Element. However, there is potential for changes in specific pollutants and chemical elements as a result of augmentation and abstraction. This should be assessed in more detail at future project stages.

7.4 Creation of new WFD water bodies and changes to existing WFD water bodies

7.4.1 The Environment Agency is responsible for the designation and classification of all WFD water bodies in England.

7.4.2 Due to its size exceeding 40 hectares SESRO will, in future, be a new 'lake' WFD water body. All man-made reservoirs in the UK are considered 'artificial' and it is expected that SESRO will be designated as 'artificial' meaning that its objective will be to attain 'Good Ecological Potential'. More water quality modelling and assessment work is needed to ascertain how SESRO may compare against water quality standards for (artificial) lakes as currently set out in the 2015 Directions[5]. More work is also needed to confirm the future likely ecology of the reservoir.

7.4.3 In addition, changes to the hydrological catchments for the Cow Common Brook, Mere Dyke system and East Hanney Ditch as a result of the creation of SESRO and the Cow Common Brook and Mere Dyke watercourse diversions would mean that there could be changes to catchment outlines for the Cow Common Brook and Portobello Ditch WFD water body; and the Childrey Brook and Norbrook at Common Barn WFD water body. In turn, this may result in changes to the way these are currently presented and classified on the Environment Agency Catchment Data Explorer[18]. It is currently unknown how these water bodies may be reclassified, for example if the East Hanney Ditch may continue to be grouped with the lower Childrey Brook, if the Cow Common Brook and Mere Dyke watercourse diversions are kept together; or if all these watercourses are to be split out into individual WFD water bodies. Because the watercourses around the reservoir will be left in an improved hydromorphological condition when compared to the existing configuration, it is not expected that these water body revisions will result in a 'heavily modified' designation.

7.5 Regulation 19

7.5.1 As the proposed Project is WFD compliant based on the mitigation embedded into the proposed Project design and the mitigation outlined for construction, there is no requirement for further mitigation and the residual risk of non-compliance is low. As a result, Regulation 19 does not apply to the proposed Project. It is presumed that the embedded mitigation outlined within this assessment would be secured through the DCO process at later project stage. However, should there be any significant deviation from the mitigation outlined, the conclusion of this WFD assessment should be re-visited.

8. Conclusions and recommendations

8.1 Summary

8.1.1 The assessments undertaken in the Gate 3 process have identified those water bodies that need to be screened into future assessment phases of work on SESRO as they cannot be discounted at this stage of the process. These included:

- Childrey Brook and Norbrook at Common Barn – GB106039023380;
- Sandford Brook (source to Ock) – GB106039023410;
- Cow Common Brook and Portobello Ditch – GB106039023360;
- Ock and tributaries (Land Brook confluence to Thames) – GB106039023430;
- Thames (Evenlode to Thames) – GB106039030334;
- Thames Wallingford to Caversham – GB106039030331;
- Thames (Reading to Cookham) – GB106039023233;
- Thames (Cookham to Egham) – GB106039023231; and,
- Thames (Egham to Teddington) – GB106039023232.

8.1.2 Water bodies that have been screened out from further assessment are detailed below:

- Ginge Brook and Mill Brook (GB106039023660)
- Shrivenham Corallian (GB40602G60060)
- Vale of White Horse Chalk (GB40601G601000)

8.1.3 Further work on various proposed Project elements associated with the latest designs would increase confidence on the likely impacts that the proposed Project would have on the water environment. Recent work has demonstrated that the length of watercourse diverted under the footprint of the reservoir and ancillary infrastructure can be mitigated for.

8.1.4 In future phases of the proposed Project, it is recommended that work focus on the key areas detailed Section 8.4.

8.1.5 Despite the findings of the various assessments, based on a precautionary principle, it is recommended that the various water bodies are retained for further assessment when increased data collection can reduce uncertainties and help refine mitigation requirements. Land access restriction has inhibited data collection to date.

8.1.6 For each of the WFD water bodies screened in, the latest assessment concluded that with the proposed mitigation all WFD water bodies have the potential to be compliant and therefore should not require derogations in line with Regulation 13(2) and 13(5)a.

8.2 River Ock and Tributaries

8.2.1 The current proposed Project concept shows no impact on Ginge Brook and Mill Brook (GB106039023660) and thus it can be screened out from further assessment unless changes to the project during subsequent project stages requires reassessment.

8.2.2 The work detailed in this assessment, including updated modelling and initiation of baseline data collection, has helped to refine and provide more confidence in the potential impacts on the environment from the proposed Project.

8.2.3 A notable risk to the biological Quality Elements in the River Ock relates to construction activities in the River Ock and its tributaries including the installation of crossings, the creation of watercourse diversions and the temporary loss of ditch habitats. Where required, crossing and culverts will be designed to maintain flow and sediment continuity and species permeability which will maintain the overall function and integrity of the associated watercourses. While there may be a temporary loss in habitat and species during construction, embedded mitigation in the form of the diverted and realigned watercourses as well as the new ditches created as part of the construction activities will provide a greater habitat quality. As such, it is expected that there will be beneficial changes in biological elements, with the potential to improve the overall ecological integrity of the associated watercourses.

8.2.4 A 1D Infoworks model has been developed for the River Ock. Modelling outputs suggest that the primary impact of the proposed Project in the Ock catchment, through the provision of improved hydromorphological quality, is to change residence times in the river channels and ditches around the reservoir footprint that would result in improvements in biological quality elements and a small improvement in water quality. Changes in dilution of point source pollution loads from upstream (e.g. in the Ock and Childrey Brook) are insufficient to result in any substantive change in water quality. Within the reservoir catchment the reductions in flow are broadly matched by the reductions of diffuse pollution since the loss of catchment area affects them equally (there are no known large point sources in the catchment). The modelling does not take into account changes in land use beyond the reservoir footprint within the wider catchment. This is likely to result in further improvement in water quality such that the modelling can be viewed as conservative.

8.2.5 The details of further environmental mitigation, which would be completed in later stages of the project, would help to confirm these assessments and give more detail on the level of impact. This is especially the case with impact of the change of volumes of flow and water quality from the diverted watercourses on Cow Common Brook and Portobello Ditch, Childrey Brook and Norbrook at Common Barn, and Ock and tributaries (Land Brook confluence to Thames) WFD water bodies. Whilst current modelling suggests some reduction in flows and no significant change in water quality in the Childrey Brook and River Ock,

further hydrodynamic and/or modelling is recommended in subsequent project stages for the River Ock and tributaries in case of future changes to watercourse alignments.

8.2.6 Further consideration should also be given to superficial groundwater flows and how this may affect flows in local watercourses, noting that the superficial groundwater itself is not designated under WFD. Further water quality and hydrological data gathered beyond this Gate (hampered by land-use access issue to date) should also be used to better understand groundwater and surface water interactions as well as further refine and validate the River Ock 1D model.

8.3 River Thames

8.3.1 When considering abstraction activities which would reduce the higher flows (above Q_{40}), high flows would remain protected as a result of a HoF at Sutton Courtenay and flows would remain within the range that is considered "normal" for the River Thames. As a result, the ecological and hydromorphological functions performed by higher flows remain.

8.3.2 Currently, the Thames (Evenlode to Thame) surface water body is considered compliant with the Q_{95} EFI (i.e. the hydrological regime 'Supports Good') and is considered to be in surplus when considering Q_{95} flows. The available data suggest that, when operational, augmentations from SESRO would augment low flows. In addition, additional stochastic modelling using climate perturbed model runs suggest that the release from SESRO could be offsetting the some of the future modelled lower flows in the River Thames which have been predicted as a result of more variable future weather patterns as a result of climate change during low flow conditions in the Thames, particularly during summer and early autumn. Under SESRO operation flows at or below Q_{90} would likely be comparable or are greater than those of the current baseline. As a result, the Thames (Evenlode to Thame) surface water body would remain compliant with the EFI (based on current Q_{95} and a future predicted Q_{95}). Furthermore, augmentation of low flows in view of climate change impacts would result in important ecological functions being maintained.

8.3.3 The water quality immediately downstream of the SESRO augmentation on the River Thames has shown to improve as a result of the discharge of water from SESRO for the modelled determinands (algal concentrations, BOD, Dissolved Oxygen, Ammoniacal Nitrogen, Nitrite, Nitrate, Silicate, Suspended Solids, and Total Phosphorus). The only slight decline were transient small changes in BOD, Ammoniacal Nitrogen and Algae with no clear change longer term water quality statistics. These water quality changes are not expected to result in a change in the observed communities considered in the classification of the biological elements. In considering these results, it is important to note that the selected scenario periods aimed to represent the range of SESRO operation rather than the range of meteorological and hydrological conditions that would influence WFD compliance. Because the scenario years represent periods of less than

average river flow, the outputs are likely to be 'conservative' because they do not include wetter years in which SESRO operation would be less and there would be greater dilution of upstream pollution inputs.

8.3.4 As the water quality changes are not expected to result in changes in the expected communities, deterioration in the biological Quality Elements is considered unlikely and the water quality changes will not prevent the biological elements from attaining WFD objectives.

8.4 Recommendations

River Ock and Tributaries

8.4.1 A significant amount of work has been undertaken to refine the watercourse and ditch re-alignments around the proposed Project footprint since the production of the previous WFD assessment. However, further assessment is required to determine the quality of the baseline habitat (with respect to flow, water quality and ecological communities) impacted and then mitigation (quality and quantity) re-assessed in light of the findings. Site investigations have commenced in 2024 where land access is available, further access is now becoming available to continue and extend these surveys.

8.4.2 Connections between watercourses and ditches with other proposed Project elements need to be assessed further to determine the most appropriate connections, notably:

- Watercourse diversions - The form and functioning of the Cow Common Brook Diversion, East Hanney Ditch Diversion and the Mere Dyke Diversion and Portobello Ditch (the Cow Common Brook Diversion) will need further design to ensure that they maximise habitat diversity and WFD compliance. Further assessment on how the Mere Dyke Diversion can intercept sub-surface flow and how this may impact the baseflow and thus channel form and function of the new channel is necessary in the next iteration of the project design.
- Watercourse realignments - The form and functioning of the River Ock and Landmead Ditch realignments will need further design to ensure that they maximise habitat diversity and provide sufficient mitigation to support WFD and BNG mitigation requirements.
- Ditch network – The layout and design of the ditch network will need to be furthered and connections to the watercourses considered. There is a balance from an ecological perspective between connecting to the watercourses (to enable them to be used as backwaters) or having them off-line to maintain a potentially improved water quality and higher ecological value. To determine the most appropriate alignments and ditch typologies a hydrological and water quality assessment are required which will determine how the current network arrangements would perform. Currently, this has higher quality ditch typologies screened by lower quality ditches. The assessments need to assess the potential for sub-surface flow in the ditch network locations. In addition, an assessment of how to maintain flow levels

within the ditch networks would be necessary which may involve the siting of flow control structures at key locations.

- Flow considerations – Flow considerations in Landmead Ditch and the River Ock would need to be assessed with regard to changes in flow as a result of the diversion of Cow Common Brook and the Mere Dyke. For the Cow Common Brook this change means that this watercourse would connect to Landmead Ditch further upstream than is currently the case. An assessment of the potential change in capacity required would need to be assessed and mitigated for as appropriate. For the Mere Dyke diversion, the current alignment has the watercourse joining the River Ock further upstream than is currently the case. Thus, an assessment of the potential change in capacity required would need to be assessed and mitigated for as appropriate.
- Watercourse crossings – On all WFD designated water bodies across the proposed Project area, it is assumed that a clear span bridge would be installed on all new road and track crossings (including footpaths) to allow for natural bed and banks to either remain, or be constructed, accordingly. The only exception is a handful of very small ditches to the very northeast of the site (to be crossed by the main access road); and some very small ditches towards the south of the site (to be crossed by the new Steventon to East Hanney Road). Clear span bridges would allow for free movement of species within the watercourse and mammal passage up and downstream. This includes the Cow Common Brook diversion, the River Ock and Sandford Brook. There is one instance where a box culvert is being considered instead of clear span bridge on WFD water bodies and this is to throttle flow upstream to ensure that water spills out into the upstream floodplain compensation areas under a particular scenario. This is located on the proposed canal route on the Cow Common Brook diversion. However, following response form the Environment Agency to the EIA Scoping report, they have raised concerns with the use of box culverts on any watercourse. The Environment Agency have stated that '*A permit for a culvert will only be granted where there is no reasonably practical alternative, and if the detrimental effects would be sufficiently minor that a more costly alternative would not be justified or there are reasons of overriding public/economic interest. If culverts are proposed, the developer will need to model the hydrology of the culvert installation and how this relates to flood risk.'* These requirements will need to be considered in consultation with the regulators at future project stages.
- In this instance, adding a box culvert should be seen as a last resort and alternative methods should be investigated to reduce the potential need for the culvert and its length. For example, a bund could be created upstream with a short culvert and then a clear span bridge be constructed downstream. In all instances where a box culvert would be installed (on all non-designated WFD water bodies) the box culvert should be designed to allow for passage for the full range of fish species as well as providing for mammal passage. The box culverts should be installed with an embedment depth of gravels (ideally up to 300 mm but at least 100 mm). In cases where the box culverts are too small to physically install the gravels, they should be

constructed at least 100 mm below the bed of the river up and downstream of the structure to allow a natural bed to form over time. Pipes should be avoided on all watercourses across the proposed Project area and should only be installed on the new ditch network for maintenance access.

8.4.3 Comparison of modelled river water quality before and after the development of SESRO show beneficial impacts on water quality were small. However, further work will be required to validate the results with data collection and updated modelling to confirm these findings.

8.4.4 In all likelihood, the new reservoir would be classified as a WFD 'Lake' water body. As such, this would need to be classified by the Environment Agency, who will need to set the appropriate WFD standards based on lake typology. This would need to be defined as the proposed Project moves into future stages of design. A number of nutrient reduction initiatives are currently proposed within the River Thames catchments upstream of the SESRO intake, including AMP8/AMP9 improvements at Sewage Treatment Works operated by Thames Water. These future reductions have been factored into the River Thames water quality predictions for the River Thames for the year 2040 when the reservoir would be operational. Model predictions currently suggest that this could improve the quality of water taken into SESRO so the water in the reservoir itself could become indicative of 'good' status for phosphorus. This future prediction however has some uncertainty and will need to be reviewed over time, as and when nutrient reductions initiatives are delivered and confirmed through water quality sampling.

Abstraction from, and augmentation of, the River Thames

8.4.5 The impacts of the abstraction from and augmentation into the River Thames needs to be considered further in relation to potential opportunities and impacts of these changes on the flow regime and water quality on the downstream water bodies and what impacts and benefits that this may have. Further assessments in 2024 have largely confirmed previous work whereby changes in depth along the River Thames as a result of the triggered releases from SESRO, that are based on cross sectional averages, show a small increase of less than 10 cm during the SESRO release within 10 km of the outfall, that decreases downstream. The modelling work in Gate 3 has improved representation of the influences of control structures on head which indicates less impact than was thought to be the case previously. However, the modelling continues to not take into account full details of local operating procedures and thus needs validation during subsequent project stages. The modelling would be refined and updated as part of the consenting process. Specifically, further work would be required to assess the interaction with weir level management and the opportunity to optimise velocity and level with navigation and environmental requirements.

8.4.6 Overall, the water quality and hydrological modelling immediately downstream of the SESRO augmentation has shown that the water quality will improve as a result of the augmentation of water from SESRO. The latest modelling shows

that while the abstraction activities would reduce the higher flows (above Q_{40}), low flows would remain protected as a result of the Hands off Flow (HoF) at Sutton Courtenay and flows would remain within the range that is considered "normal" for the River Thames. As a result, the ecological functions performed by higher flows (e.g. ensuring connection to floodplain, maintenance of nutrient and organic matter exchanges between river and floodplain where connectivity still exists, transport and deposit debris and detritus, maintains low abundances of phytoplankton, etc.) are maintained. During augmentation, the modelling has shown that when SESRO is in operation it would augment low flows, remain compliant with the EFI and support in offsetting some of the predicted lower flows in the River Thames as a result of climate change. Further modelling would be required to validate the modelling undertaken to date. Should the operational that has been proposed change than the WFD assessment will need to be reviewed accordingly.

8.4.7 Should there be a change in the proposed operational regime of SESRO then there would need to be a re-assessment of the impacts on the performance of existing and potentially planned fish/eel passes on the Thames as well as the weir streams in general that are likely to be impacted by changes in the flow conditions.

8.4.8 Impacts of the augmentation regime on scouring of the bed, or opposite bank, along the River Thames would need to be assessed further as the design and operation of this structure evolves. Potential implications of localised flow changes on navigation would also need to be considered.

8.4.9 The assessment of the risk to the fish communities associated with the intake and proposed screening arrangements should be continuously reviewed to ensure compliance with the relevant legislation.

8.4.10 At the planning stage, a cumulative assessment should be completed to determine potential cumulative effects of this SRO in combination with other developments within the study area. Additionally, an in-combination assessment should be completed at the planning stage to determine the in-combination effects from multiple SROs which have the potential to impact the River Thames.

8.4.11 The exact operating regime for SESRO will be confirmed with the Environment Agency as part of subsequent project stages and environmental permit (pre)application discussions.

Reducing Uncertainty

8.4.12 Going forwards, further work is required to reduce the uncertainty detailed in Table 4.3 . This includes a list of work items detailed in Table 8.1.

Table 8.1 Work plan required to address remaining uncertainty

Work items	Description
Baseline data collection	Continued collection of baseline information across the site footprint and also in upstream (reference) reaches for Annex V Quality Elements, notably catchment walkovers and surveys for geomorphology (e.g., MoRPh), hydrology (levels, patterns of wetting and drying and flow), groundwater levels and quality, surface water quality, fish populations, invertebrates and aquatic flora. INNS should also be included. Site investigations have been conducted in 2024 but due to land access constrictions the extent of these surveys have been restricted. Where surveys have been undertaken / data are available these corroborate assessment findings to date. A better spatial coverage of the data will help better define baseline conditions and provide information to support further assessment and enable designs to maximise benefits.
Water levels	River and shallow groundwater levels within watercourses across the site need to be better understood, preferably using continuous level loggers set out in both main channels and smaller ditch tributaries. Shallow groundwater level loggers also need to be installed across the catchment along with a rain gauge. Together, these data will help better understand the pattern of wetting and drying across the site and the relative influence of rainfall and groundwater. They will also help to determine potential future water sources for ponds and wetlands.
Borehole data	Borehole data should be collected from a grid of locations across the site and used to establish the underlying superficial substrate. Boreholes should be kept open, lined with a permeable casing and groundwater level monitored for as long as possible (ideally 12 months plus) to understand summer and winter water levels. Open test pits can be used as an alternative to boreholes if needs be.
Flow considerations	Flow considerations in Landmead Ditch and the River Ock need to be assessed with regard to changes in flow as a result of the diversion of Cow Common Brook and the Mere Dyke. For the Cow Common Brook this change means that this watercourse would connect to Landmead Ditch further upstream than is currently the case. An assessment of the potential change in

Work items	Description
	capacity required would need to be assessed and mitigated for, as appropriate. For the Mere Dyke diversion, the current alignment has the watercourse joining the River Ock further upstream than is currently the case. Thus, an assessment of the potential change in capacity required would need to be assessed and mitigated for as appropriate.
Watercourse alignments – flow routing	Any changes to watercourse alignments and flow routing should be re-assessed using a 1D hydrodynamic model.
Watercourse diversion and realignment design	The Gate 3 design of water courses should continue to be reviewed to ensure that it meets WFD objectives.
Fish screening arrangements	A review of the fish screening arrangements has been undertaken in accordance with the Eel Regulations. This review considered the Best Available Technologies. Further assessment of fish entrainment risks will be required as the detailed design of intakes is progressed which will also consider the operation of the intakes.
Construction phasing	More detail will be needed on construction phasing to inform the sequence and timing of new watercourses being created. This will need to provide detail on a more local scale of how some of the smaller watercourses are connected/disconnected to the main streams than has been done to date. The phasing will consider the sensitive periods for the fish communities associated with the watercourses subject to realigment.
INNS - construction	Given the presence of INNS in some of the existing watercourses, methodologies for the translocation of macroinvertebrates, macrophytes and fish and creation of new habitats (including any planting required) will need to be agreed with the Environment Agency in advance of works starting. A Biosecurity Management Plan will be developed for the construction phase.
INNS – operation	SESRO will be in continuity with the River Thames (Evenlode to Thame) WFD water body, which does contain INNS species. Other than screening, it is not proposed that the raw water taken into SESRO will be subject to additional treatment.

Work items	Description
	A second, separate, Biosecurity Management Plan will be developed for the operational phase.
Engagement with Ock Catchment Partnership	Continue to work with the local Ock Catchment Partnership (led by the Freshwater Habitat Trust) to identify synergies and opportunities.
Surface Water Management Plan	A comprehensive Surface Water Management Plan will need to be developed to manage water quality and flow arising from the construction site to prevent this from affecting the new watercourse diversions and their recovery.
Resilience of watercourse and ditch designs	Future assessment should consider the resilience of the watercourse and ditch designs, and review of the designs under varying water availability scenarios. For example, adjustments to the watercourse cross sections and ditch depths to retain water for longer, if required.
Environmental permit	Thames Water will continue to engage with Environment Agency local and national hydrology and permitting teams to discuss the future operating regime.
Monitoring Plan	A Monitoring Plan will need to be developed to monitor baseline conditions as well as the speed of re-colonisation following the creation of the new watercourse diversions and other aquatic habitats.

Biodiversity Net Gain (BNG)

8.4.13 Noting that BNG is not a requirement for WFD compliance, work undertaken in 2024 has shown that mitigation for the loss in length of watercourses and ditches can be achieved across the proposed Project based on the current BNG Metric.[46] It aligns with Defra's latest guidance on 'What you can count towards a development's biodiversity net gain (Defra, 2024)[47].' For the rivers and ditches part of the metric it is important that this impact is assessed and updated, and any mitigation requirements integrated into the proposed Project's design going forward. As the proposed Project progresses the BNG would need

[46] *South East Strategic Reservoir Option (SESRO), Gate 3 Biodiversity Net Gain Assessment, October 2024. J696-AJ-A02X-ZZZZ-RP-EN-100040.*
[47] *Defra, 2024, What you can count towards a development's biodiversity net gain, https://www.gov.uk/guidance/what-you-can-count-towards-a-developments-biodiversity-net-gain-bng.*

to be assessed using any revisions to DEFRA's BNG metric which would be applicable to the project. At this stage, it is not certain if a specific metric will be provided to assess NSIPs or if the standard metric will be applied.

Appendix A Scoping of water body measures

A.1 Programme of Measures

The following Table identifies the Programme of Measures (PoM)[25] for the Thames RBD which are potentially prevented by the proposed Project. Measures which are specifically noted for screened out Operational and Management catchments, are not presented in the Table below.

All measures have been scoped out of any further assessment as outlined in Section 6.4.

Measure	Summary Measure information	River Basin District	Management catchment	Operational catchment	Water body name	Scoping – justification
Water Industry Asset Management Plan Price Review 2019 Water Industry National Environment Programme schemes – catchment schemes	Catchment schemes e.g. Farm nutrient management plans and soil testing – improved farming practice	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2019 Water Industry National Environment Programme schemes – water resources	Sustainable abstraction improvements through changes to abstraction licences, licence conditions and non licence changes at specific sites	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Abstraction Plan delivery – Environment	Greater access to water and sustainable abstraction improvements through: changes to abstraction licences including compulsory and voluntary licence changes, time limited licences renewal, apply powers for serious damage, revocation of unused licences, reducing quantities on under used licences and non licence changes	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Abstraction Plan delivery – Priority Catchments	Working collaboratively with all stakeholders to deliver integrated catchment solutions to mitigate the impact of climate change and unsustainable abstraction. Update Abstraction Licence Strategy with findings from priority catchments by 31 July 2021	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Environment Agency Environment Programme and Flood and Coastal Risk Management capital programme	Diffuse pollution control initiatives, recovery of priority species – habitat restoration or creation and reintroducing species	Thames	Various	Various	Various	Out – The Project supports this measure through habitat creation within the Ock catchment and movement from agricultural management practices which could be a source of diffuse pollution.
Water Industry Asset Management Plans Price Review 2019 Water Industry National Environment Programme schemes – sewage	Sewage treatment improvements by changes to licence conditions at specific sites	Thames	Various	Various	Various	Out – The Project is not relevant to the implementation of this measure.

Ock Arable Project. Mechanism = Environment Agency Environment Programme and Flood, Coastal Erosion Risk Management (Flood and Coastal Risk Management) capital programme	Engage with farmers across the catchment and develop a farmer cluster group to help tackle pollution and improve the water environment.	Thames	Gloucestershire and the Vale	Ock	Ock (to Cherbury Brook), Childrey and Woodhill Brooks	Out – The Project is not relevant to this measure as it is specific to a water body scoped out of this assessment.
Aquatic Biosecurity Campaigns	Slowing the introduction and spread of Invasive Non Native Species via public awareness campaigns including Check, Clean, Dry. Funded by the Aquatic Biosecurity Partnership	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Enabling actions and legislation to enforce actions in the European Union Invasive Alien Species Regulation	Various measures controlling Invasive Non Native Species. Enabling actions and legislation to enforce actions in the European Union Invasive Alien Species Regulation	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Great Britain level co-ordination of Invasive Non Native Species actions	Various measures to control Invasive Non Native Species. Co-ordination of Invasive Non Native Species actions and approach via the Great Britain Invasive Non Native Species programme board and strategy	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
National Highways Invasive Non Native Species control work	Various measures to control Invasive Non Native Species by National Highways	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Invasive Non Native Species eradication – national programmes	Various measures to control Invasive Non Native Species. National eradication and control programmes for aquatic Invasive Non Native Species e.g. top mouth gudgeon and water primrose	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Management of invasive non-native species at selected protected sites by Natural England	Various measures to control Invasive Non Native Species. Management of invasive non-native species at selected protected sites by Natural England	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Invasive Non Native Species Secretariat; co-ordination of alert system, species records, and the Invasive Non Native Species Information Portal	Various measures to control Invasive Non Native Species. Supporting data, evidence and processes to inform Invasive Non Native Species control and management	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

Partnership pennywort work – developing a shared strategy	Various measures to control floating pennywort	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Environment Agency, Natural England and partners will implement rapid responses to contain and eradicate new Invasive Non Native Species invasions, where practicable	Various measures to control Invasive Non Native Species Invasive Non Native Species – rapid response	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Invasive non native species local action groups	Funding and support for local Invasive non native species action groups	Thames	various	various	various	Out – The Project does not prevent the implementation of the measure
England Woodland Creation Offer	Tree planting primarily to achieve UK Net Carbon Zero with incentives to target woodland in places with biodiversity, flood, water quality, water resources and climate adaptation benefits	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Riparian shade – provide tools and evidence to deliver targeted riparian shading at greater national scale with partners – Keeping Rivers Cool 2 – an England-wide tree shade map	Geographic Information Systems based tool to target woodland creation to provide riparian shade in areas most at need	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Safeguard and create thermal refuges through tree planting/fencing to increase riparian shade	Riparian tree planting and fencing – Seek to safeguard and create thermal refuges through tree planting/fencing to increase riparian shade – target 50,000 trees and 50 km fencing in England by 2024	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Water Industry Asset Management Plan Price Review 24 Water Industry National Environment Programme schemes – Habitat improvements	Habitat restoration or creation and species recovery. E.g. river and lake restoration, removal of barriers to fish movement, tackle Invasive Non Native Species, achieve objectives for water-dependent Sites of Special Scientific Interest and European sites, and actions to conserve and enhance priority habitats and species	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Maritime Fisheries Fund	Explore opportunity for Maritime Fisheries Fund to support measures to protect migratory fish in the marine environment	Thames	Various	Various	Various	Out – The Project supports this measure through improvements to aquatic habitats within the Ock catchment.

Fisheries Improvement Programme and Wild Trout Trust contract	Various habitat improvement projects to benefit fisheries in partnership will have additional benefits for River Basin Management Plans environmental objectives	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Nature Recovery Network	Various actions to protect, improve, expand, and connect habitats including water and water-dependent environments. Sites designated for nature conservation, such as European sites and Sites of Special Scientific Interest are at the core of this network	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Green Recovery Challenge Fund	Various environmental improvement projects – fish passage; land management change to address pollution; river, lake and wetland restoration; tree planting; peatland restoration. £80 million funding value over two £40million rounds, Round 1 delivery by March 2022, Round 2 by March 2023	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Nature for Climate peatland restoration capital grant scheme	Creation and restoration of peatland – habitat creation and enhancements	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Implement actions required to achieve and maintain objectives for European sites	Implement 'remedies' for the Sites of Special Scientific Interest that underpin water-dependent European sites. Remedies are actions needed to address reasons for adverse condition and restore the site to favourable condition. These are site-specific remedies and agreed between Natural England and the organisation responsible for their delivery on the site. Continue to progress actions identified in Site Improvement Plans. These provide a high level description of issues affecting the condition of a site and identify priority actions required to address the issues	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Lake Restoration Programme for European sites and Sites of Special Scientific Interest	Continue developing and implementing lake restoration plans for European site and Site of Special Scientific Interest lakes e.g. action to improve water quality, advice on nutrient management within the catchment, restoration of natural hydrological regime, restoration of	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

	vegetation and natural fish communities, sediment removal					
Wet agriculture and peatlands forestry – Paludiculture Exploration Fund	Providing technical support for new facilitative fund. Enable paludiculture (wetter farming) to become viable as a way of conserving carbon by raising the water table in peat soils, whilst maintaining a (different) peatland agricultural land use	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Delivery of Lowland Agricultural Peat outcomes	Develop strategic position on future for sustainable land use on lowland agricultural peat soils	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
River Restoration Programme for European sites and Sites of Special Scientific Interest	Continue to develop and implement strategic river restoration plans for European sites and Site of Special Scientific Interest rivers	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Improving Fish Passage at Environment Agency Assets	Improving fish passage at Environment Agency assets through opportunities and partnership programme of works approach	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Leaders Group aligned approaches to landscape scale restoration, from soil to sea	Water Leaders Group to act as advocates for landscape-scale restoration of natural processes within our freshwater catchments and coastal waters	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Catchment Sensitive Farming Rural Development Programme England	Various farm infrastructure improvements and wider agricultural practice	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Championing the Farmed Environment – Advice to farmers on environmental improvements	Various measures to prevent impacts from agriculture	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Countryside Stewardship Agri-env, including Water Environment Grant, schemes that run over into 2022 to 2027	Various environmental improvements by farmers and land managers including on farm, river corridor improvements and wider collaborative nature based solutions including Natural Flood Management	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Environment Land Management Schemes	Various environmental improvements by farmers and land managers including on farm improvements to wider collaborative nature based solutions including Natural Flood Management and buffer zones	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

Regulation of agricultural and rural land including targeted regulation of protected areas such as Nitrate Vulnerable Zones	Regulation by Environment Agency officers – preventing pollution of nitrates, phosphates and sediment. Increased agricultural regulatory resource secured in 2021 continues to at least 2025. Activity focusses on: compliance with the Farming Rules for Water; compliance with Silage Slurry and Agricultural Fuel Oil Regulations. The aims are: - reducing diffuse pollution to all waterbodies including lakes, with a specific focus on protected sites - reducing point source pollution incidents, such as: oil spills, slurry store failures, silage effluent incidents	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Tried and Tested – Advice to farmers on nutrient management	Agricultural nutrient management	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Diffuse Water Pollution Plans for European sites	Continue progressing implementing Diffuse Water Pollution Plans for European sites where the site condition is affected by diffuse water pollution.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Nature Based Solutions	Develop a strategic position and associated guidance on Nature Based Solutions, to support our activities and engagement with those working in this area	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Environment Agency Third Adaptation Report and associated actions	Various actions to improve the Environment Agency's approach to adapting to climate change	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Re-fresh of Shoreline Management Plans	The Environment Agency has been working closely with the Coastal Group Network to manage a ‘refresh’ of the Shoreline Management Plans (SMPs) covering the English coast. The current SMPs were developed between 2006 and 2012. The refresh is not a third cycle of SMPs, but an update to ensure SMPs reflect the most current evidence, experience, and policy. The SMP Refresh project will be completed March 2023.	Thames	Various	Various	All	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.

Environment Agency Flood Coast Risk Management Coastal Habitat Compensation and Restoration Programme	Environment Agency Flood Coast Risk Management Coastal Habitat Compensation and Restoration Programme The Regional Habitat Compensation Programme (RHCP) is a strategic programme run by the Environment Agency which seeks to replace habitats that are lost due to coastal squeeze or tidal inundation effects that arise from the management of coastal defences Regional Habitat Compensation Programme — Coastal Partners	Thames	Various	Various	All	Out – The Project does not prevent the implementation of the measure
National Coastal Erosion Risk Map 2	National Coastal Erosion Risk Map 2 Update to the: National Coastal Erosion Risk Mapping (NCERM) – National (2018 – 2021) – data.gov.uk	Thames	Various	Various	All	Out – The Project does not prevent the implementation of the measure
National Network of Regional Coastal Monitoring Programmes	National Network of Regional Coastal Monitoring Programmes	Thames	Various	Various	All	Out – The Project does not prevent the implementation of the measure
Environment Agency Flood Coast Risk Management Maintenance Programme	Implement the recent changes to funding policy arrangements, including payment for environmental benefits, the Environmental Statutory Allowance and Nature for Climate funding, to achieve greater environmental co-benefits from projects that manage flood and coastal erosion risk (Timescales: by 2027).	Thames	Various	Various	All	Out – The Project does not prevent the implementation of the measure
Environment Agency Flood Coast Risk Management Funding	Implement the recent changes to funding policy arrangements, including payment for environmental benefits, the Environmental Statutory Allowance and Nature for Climate funding, to achieve greater environmental co-benefits from projects that manage flood and coastal erosion risk (Timescales: by 2027).	Thames	Various	Various	All	Out – The Project does not prevent the implementation of the measure
Environment Agency Flood and Coastal Risk Management capital programme beyond current confirmed projects	Delivery of Mitigation Measures for Flood and Coastal Erosion Risk Management assets – river restoration and fish pass improvements	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

Environment Agency Navigation Capital Asset Investment	Addressing physical modification on Environment Agency owned regulatory assets to maintain navigable waterways and restore fish passage	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Leaders Group work on integrated investment in catchments	Water Leaders Group develop shared guidance and case studies for integrating investment in and across catchments	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Natural Environment Investment Readiness Fund (NEIF)	Create new woodlands, restore peatlands, create new coastal wetlands, restore freshwaters and wetlands	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Leaders Group shared guidance on developing and implementing market approaches to Paid Ecosystem Services	Implement measures through Paid Ecosystem Service markets	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Nature Based Solutions Landscapes Project	A set of demonstration projects to develop the multi-sector funding approach to landscape-scale Nature-based Solutions, funded through Shared Outcome Fund	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Environment Transformation (WET) Programme	The Environment Agency to explore more flexible approaches to permitting, to support wider implementation of nature based solution through water industry price review process (PR24) and land managers/agriculture sector.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
European Union Structural Funded projects that may run over into 2022 to 2027 e.g. European Union Inter Regional Cooperation Programme Projects	Various environmental improvement projects e.g. pollution control initiatives, abstraction management and habitat restoration	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Other Heritage Lottery, Landfill Charge Levy or Philanthropic funded projects that may run over into 2022 to 2027 e.g. European Union Inter Regional Cooperation Programme Projects or Local Enterprise Partnerships funded projects	Various environmental improvement projects e.g. pollution control initiatives, abstraction management and habitat restoration	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
UK Prosperity Fund projects that may run over into 2022–27 e.g. with Local Enterprise Partnerships	Various environmental improvement projects e.g. pollution control, abstraction management and habitat restorations pollution control initiatives	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.

Explore better data sharing approaches with Arm's Length Bodies and partners	Data sharing restrictions between partners, including Arm's Length Bodies can be a barrier for a holistic targeted approach to regulating, advice and grant aid. Explore better data and evidence sharing approaches	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Environment Agency Championing Coastal Coordination (3Cs) Project Phase 2	Phase 2 – work with coastal partners and other interested parties to review the phase 1 pilots and develop recommendations for a national framework for future governance and joint working to improve alignment of water planning and delivery.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Catchment Based Approach	Catchment partnership led projects and measures related to multiple funding streams and outcomes for water quality, quantity, habitat and flood risk reduction. Examples can be seen in the River Basin Management Plan Catchment Partnership Pages	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Improved Integrated Local Delivery	Working with partners, to improve strategic national engagement for local collective action. Achieve this through better collaborative system governance, alignment and integration from catchment to coast for multiple environmental and social outcomes and climate resilience e.g. towards a national framework for water governance, local estuarine and coastal restoration plans	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Blue Impact Fund – Marine habitat restoration fund bid	Developing ocean trust fund to support marine environmental enhancement	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Environment Agency programme of work to realise our Ambition for Water	Various measures arising from the Environment Agency reviewing their approach to water and setting out a roadmap for how they will work with partners to deliver our Water Ambition. This will coordinate multiple activities detailed elsewhere in this River Basin Management Plan Programme of Measures spreadsheet	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Environment Improvement Fund	Local habitat/Invasive Non Native Species improvement schemes and agricultural/urban pollution control initiatives. Also funding 2021–22	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

	to support improved coordination of coastal-based partnership working					
Environment Agency Environment Programme beyond current confirmed projects	Diffuse pollution control initiatives, recovery of priority species – habitat restoration or creation and reintroducing species	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Environment Act Targets water and biodiversity	The Environment Act 2021 stipulates the Government will set a minimum of one long-term legally binding targets in four priority areas. These include water, waste and resources, air quality and biodiversity. There will need to be various environmental improvement projects to achieve these targets. The public consultation on the proposed targets closed on 27 June 2022. Those proposed for water include addressing rivers polluted by abandoned metal mines, pollution coming from wastewater; agriculture and to reduce water demand. Biodiversity targets will also aid the environment by halting the decline of species abundance, extinction and creating wildlife-rich habitats in our streams, rivers, estuaries and coastal waters.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Leaders Group aligning approaches to behaviour change campaigns on water		Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets, creation of wet woodland and improved habitat and through the provision of sustainable abstraction into the future.
Development Planning – Statutory Biodiversity net gain	Planning requirement that aims to ensure that developments have a net positive impact on biodiversity overall, by minimising any negative impacts, restoring existing areas or offsetting	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
A new framework of Green Infrastructure Standards supports mainstreaming of good green-blue infrastructure	Various measures that result in greener cities and cleaner waters	Thames	Various	Various	Various	Out – the Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.

Local Nature Recovery Strategies	Various actions to protect, improve, expand and connect habitats including water and water-dependent environments. These will be identified through the Statement of Biodiversity Priorities and the Local Habitat Map in each Local Nature Recovery Strategy. Actions to restore habitat should seek to deliver wider environmental outcomes such as flood risk mitigation, water quality improvements and climate change adaptation wherever possible	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
National Highways Strategic Road Investment Strategy	Measures to mitigate impacts from road run-off	Thames	Various	Various	Various	Out – The Project supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Regulatory campaigns in urban areas including industrial estates and retail parks	Regulation by Environment Agency officers – prevent pollution	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Environment Agency Chief Scientific Advisors Office Clean and Plentiful Water Environmental Quality Standards Project	Environmental Quality Standards development post European Union Exit	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes arising from Chemicals Investigation programme	Sewage treatment improvements through changes to licence conditions at specific sites	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes – catchment	Catchment schemes e.g. Farm nutrient management plans and soil testing – improved farming practice	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Implement findings from review of Polluter Pays/Fair Share project due end of 2021	Price Review/Asset Management Plan	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes – sewage	Sewage treatment improvements through changes to licence conditions at specific sites	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

Drainage Waste Water Management Plans to inform measures identified by Water Industry in Price Review24	Integrated drainage management – Measures to address pollution, flood risk and habitat function	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Abstraction plan 2 – Refreshed Sustainable abstraction plan delivery	Measures include: changes to abstraction licences including compulsory and voluntary licence changes, time limited licences renewal, application of powers in relation to actual and risk of serious damage, risk of deterioration and actual deterioration, revocation of unused licences, and reducing quantities on under used licences and non licence changes, delivery of a stronger catchment focus updating Abstraction Licence Strategies	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Achieve sustainable abstraction to deliver resilient catchments and meet the challenge of climate change	Greater clarity on un-sustainable abstraction improvements through: changes to abstraction licences for example time limited licences, serious damage, unused licences, new authorisations. New licences issued only to the sustainability standards of the flow and groundwater objective thresholds as consulted. Deviation from this only by agreed quality of scientific evidence, provided at the developers cost	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Develop Environmental Destination statements. Establish a consistent understanding of the long term water resource needs and climate change impacts	Environmental destination statement informs regional planning options and on the ground measures	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Implementation of a stronger catchment focus for water resources	Working collaboratively with all stakeholders to deliver integrated catchment solutions to mitigate the impact of climate change and unsustainable abstraction. Where appropriate deliver innovative solutions to increase access to water and sustainable abstracting improvements and update all Abstraction Licencing System by 2027	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Modernise our abstraction licensing service to deliver resilient and sustainable catchments and to meet the challenge of climate change	Access to water and sustainable abstraction improvements through modernising the abstraction service. Ending exemptions, moving to a digital platform and introducing Environmental Permitting Regulation and a stronger regulatory	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.

	and compliance regime based on delivering sustainable abstraction					
New Authorisations – previously Exempt Licence determinations by December 2023	Abstractions Licensed and established for review against sustainability standards at Common End Dates against surface and groundwater sustainability tests	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Review of Heavily Modified Water body and Level Managed system flow objectives to assure achievement of sustainable abstraction and ecosystems they support.	Establish sustainable flow objectives for Heavily Modified Water Bodies and Level Managed Systems to identify unsustainable abstraction and establish these thresholds for licensing and the associated groundwater sustainability for licence reviews	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Development of Regional Plans Water Resources and environmental destination statement	Give the water sector a stronger strategic steer on long term water resources planning. Includes: coordinating Regional planning groups and setting the environmental destination. Also inform the development of new water infrastructure and design future regulatory frameworks. Do this through RAPID (Regulators' Alliance for Progressing Infrastructure Development) Abstraction Licence reductions to deliver Sustainable Abstraction. This is a key measure in our response to climate change	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Time Limited Abstraction Licence renewal – Give licence holders six years notice of renewal	Licence holders have six years notice to renew time limited licences. To meet the sustainability test, the Environment Agency will mainly prioritise action to prevent deteriorations up to the end of 2027	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future which follows the RAPID guidance. Therefore, no potential for prevention of this measure.
Water Resource Assets Capital Investment	Ensure water transfer schemes are safe, resilient, environmentally sustainable and can operate when required	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes – water resources	Sustainable abstraction improvements through changes to abstraction licences and licence conditions at specific sites	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.

The Flood and Coastal Resilience Innovation Programme – 25 projects targeting flood resilience	Various measures to improve flood resilience, which may include: • nature based solutions • sustainable drainage systems • approaches for making existing properties more flood resilient • encouraging local businesses to improve their flood resilience • building community and voluntary sector capacity to respond and recover	Thames	Various	Various	Various	Out – The Project supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
As part of Water Ambition the Environment Agency will work with partners to bring a particular focus on protecting and improving chalk rivers	Various regulatory and partnership measures to improve and protect chalk rivers – quality, quantity, habitat and biodiversity	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
OxCam Arc – Working with the wider Defra group to influence the Spatial framework and wider OxCam work. Mechanism = Other local funding source	Ensuring we use planned growth and development as an opportunity for improving nature. Influencing planning policy, influencing development corporations, providing environmental evidence and advice and test/showcase best practice. Flood Alleviation Scheme tracking a spatial framework (delivered in 2 years) which will have the same standing as national planning policy and providing a framework for local authorities to follow. Influencing this to enable best outcomes for the environment.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Identify Natural Flood Management Opportunities. Mechanism = Other local funding source	Listed in the Thames river basin district FRMP – various local authorities will use a catchment based approach by 2027; to work with communities and landowners to identify nature based solutions including natural flood management. Funding Mechanism: Local authority funding.	Thames	Various	Various	Various	Out – The Project is not relevant to the implementation of this measure.
Thames natural flood management. Mechanism = Other local funding source	Thames Regional Flood and Coastal Committee collaborating on £1.3m programme of natural flood management to 2027. Also building on draft plan consultation feedback, explore across Thames scaling up catchment based approach,	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

	packaging measures, innovative finance/funding. To achieve more investible propositions, nature based solutions, social and natural capital benefits e.g. natural flood management, SUDs. Building relationships including with CaBA Catchment Partnerships and capacity through collaborative Thames RFCC working groups Funding mechanism: Thames RFCC local levy, other sources					
Rivers and Wetlands Community Day (RWCD) Fund. Mechanism = Water industry investment	The Rivers and Wetlands Community Days fund is provided by Thames Water distributed by a board consisting of the Angling Trust, the Environment Agency, the Institute of Fisheries Management, Thames Water Utilities Limited and the Wild Trout Trust. Projects are engaging and educating local communities, practically involving them in improving rivers and wetlands habitats and water quality. Examples funded include Rivers Weeks, Outfall Safaris in London, natural flood management and creating backwaters. Thirteen projects are being funded 2020/21 at various scales and locations (59 past projects completed) and the partnership is seeking future funding to continue this successful programme contributing to health, wellbeing and green skills.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Chalk and Ephemeral Stream sustainability actions and flow protection	Policy and voluntary driven abstraction reductions against ground and surface water sustainability assessment standards under CaBA Chalk stream Strategy Actions, Environment Bill sustainability standards and designations. Includes review of licences and flow objective achievement against the naturalised perennial head	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure
Implementation of the Water Resources Catchment Based Approach (CaBA) Chalk Stream Restoration Group (CSRG) chalk strategy	Policy and voluntary measures to drive abstraction reductions in ground and surface waters in chalk catchments. A local response to climate change and abstraction pressure in these catchments. Policy support is intended to develop to underwrite these.	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

Water companies work with catchment partners to support flagship chalk stream restoration projects	Habitat restoration measures	Thames	Various	Various	Various	Out – The Project does not prevent the implementation of the measure

A.2 Mitigation Measures Scoping assessment for HMWBs

The following table sets out the Stage 2Scoping assessment for the Mitigation Measures for the following HMWBs which have been screened into the Stage 2 Scoping assessment. These Mitigation Measures were provided by the Environment Agency in June 2024.

- Thames Wallingford to Caversham – GB106039030331
- Thames (Reading to Cookham) – GB106039023233
- Thames (Cookham to Egham) – GB106039023231
- Thames (Egham to Teddington) – GB106039023232

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Cookham to Egham)	37863	Multi-Species fish pass installation at Boulters mill channel & weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37864	Replace hard banks and establish shallows and emergent plants.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37865	Upgrade to multi species fish pass at Bray SU9092579733	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37866	Pigeonhill Eyot/bray mill stream phase two enhancement. SU9097779649	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37867	Connect Windsor Marina Lakes to Thames	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37868	Beach Recharge, import coarse material to dress existing beach areas along river.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37869	Eton backwater Restoration. Improve in lateral connectivity to floodplain habitat.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37870	Create a fish and wildlife channel at Old Windsor Weir	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Cookham to Egham)	37871	Create a fish and wildlife channel at Bell Weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37872	Create a fish and wildlife channel at Hedsor Weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37873	Modify sluice at Bray Mill.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37874	Install fish screen to stop entrainment, TW Datchet intake	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37875	Fish screen to stop entrainment, Sunnymeads intake, Datchet	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37876	Fish screen to stop entrainment, Hythe End intake	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37877	Fish screen to stop entrainment, Egham intake	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37878	Engaging with navigation users to reduce bank erosion and sediment input	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Cookham to Egham)	37889	Canoe fish connection through Papermill site	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37890	Amerden Stream. Augment flow using jubilee river and associated in channel enhancement work	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37891	Old Mill sluice could be modified to change the flow SU9097779649	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37892	Naturalisation of right bank of Monkey island	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37893	Managed retreat on the towpath opposite Ruddles Pool SU9373377203	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37914	Reprofile the river bank, plant vegetation and create beaches.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37915	Improve fish passage at Boveney Weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37916	Move impoundment structures upstream at Clewer Mill Stream	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Cookham to Egham)	37917	Install fish passes and habitat works at Tangier Mill Stream	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37918	Habitat enhancement through Eton College	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37919	Strategic placement of dredged material.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37920	Strategic placement of dredged material at Lower Chalvey Ditch	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37804	Restore backwater at Riverbank residential development, Staines .	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37805	Penton Hook marina create 2.5 hect BAP habitat.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37806	Restoration of backwaters at Truss's island.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37807	Enhance and extend natural bank at Silver sands, Egham TQ0364869740	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37808	Add shelter at gravel pit Penton Hook for fish shelter TQ0412869338	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37809	Backwater enhancements at Mixnams Island Penton Hook TQ0429568586	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37810	Enlarging Penton Hook backwater on north bank TQ0438969492	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37811	Selective opening up of right bank at Laleham. Create beach areas TQ0491168870	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37812	reduce the wash by having signs to reduce boat speed – Waterways	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37813	Laleham Identify piece meal bankwork for removal.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37814	Ensure water company modify fish screen at Laleham intake.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37815	Burway Ditch, Abbey mead some floodplain grazing marsh possible TQ0469667521.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37816	Remove Abbey Chase weir on Abbey River and install stoplogs which can be removed over time	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37817	Dockett Eddy enhance reinforced bank, work is located on left bank – F & B TQ0659166278	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37818	Create wetland and backwater habitats and enhance riverbank	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37819	Compensatory habitat at Desborough Island	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37820	Habitat Improvement in Backwater from Desborough Cut into Shepperton.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37821	Install mitigation if hydropower is installed on left bank	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37822	Sunbury depot island create reed bed to create BAP habitat TQ1029367893	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37823	Walton 2 intake – screening on intake to prevent fish entrapment	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37824	LTS Molesey weir – fish pass to replace fish trap finishes 2014 TQ1508968738	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37825	Install new channel to provide access to tributary and create functional flow dependent habitat	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37826	Canbury Gardens:- 1 mile of natural riverbank, beaches and habitat to rivers edge.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37827	Broom Road Teddington Natural Beach next to the recreation ground – TLS Project proposed	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37828	LTS – Teddington weir, new 2 stage fish pass proposed with hydropower scheme TQ1697971418	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37829	Redevelopment of Marina may have possible habitat enhancement	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37839	River bed raising or lowering.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37840	Create low flow channels in over-widened/over-depended channels	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37841	GB106039023232 Create reed fringes	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37842	Create shallow margin in front of hard defence	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37843	Backwater creation/enlargement at Penton Hook	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37844	Narrow over-wide channels, Sunbury lock and weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37845	Narrow over-wide channels, Penton Hook pit	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37846	Reconnect and restore historic aquatic habitats, Penton Hook pit	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37847	Reconnect and restore historic aquatic habitats. Covered by WTh_Low_001897	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37848	Recreate a sinuous river channel (re-meandering), Abbey River	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37849	Recreate a sinuous river channel (re-meandering), Hurst Park	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37850	GB106039023232 Recreate a sinuous river channel (re-meandering)	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37851	Removal of hard engineering structures (e.g. naturalisation)	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37852	GB106039023232 Replace existing structures with new structural designs	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37853	Replace hard defence with soft engineering, Sunbury lock and weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37854	Install technical fish pass, Chertsey weir.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37855	Install fish pass, Molesey weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37856	Install fish pass, Tumbling Bay weir, Sunbury	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37857	Install fish screening at Thames Water Ialeham intake.	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37858	Hampton intake install fishscreens at Thames water intake	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37859	GB106039023232 Engaging with navigation users to reduce bank erosion and sediment input	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37860	Encourage use of environmentally friendly vessel design.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37861	Lateral zoning to concentrate boats within a central channel	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37862	Limit number of mooring permits available	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37879	Design moorings for ecological benefit. E.g. offline revenue moorings.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37880	Sunbury lock and weir. Create fish and wildlife channel through Sunbury Lock Island.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37881	Create wetland and backwater features at Hurst Park	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37882	Wetland and reed bed creation at Penton Hook pit.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37883	Introduce minimum flow limits on abstractions	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37884	Abbey River, Install fishpass at Abbey Chase	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37885	Reconnect and restore historic aquatic habitats, Create compensation habitats	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37886	Penton Hook. Install fish shelters and preditor reffuge in Penton Hook Pit.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37887	Enhancement opportunities through Penton Hook marina redevelopment.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37888	Removal of hard engineering structures/ bankrehabilitation/reprofiling.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37894	Install fish pass in conjuction with Hydropower proposal at Teddington weir.	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37895	Beach Recharge, import gravel to dress selected marginal areas of the watercourse.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37896	Lower weir at Abbey Chase.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37897	Narrow over-wide channels	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37898	GB106039023232 Recreate a sinuous river channel (re-meandering)	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37899	Create a fish and wildlife channel to bypass Chertsey weir.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37900	Install fish pass on teddington boat rollers, Teddington weir	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37901	Surbiton (Seething wells) intake. Install fishscreen	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37902	Change maintenance technique to minimise disturbance	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Egham to Teddington)	37903	Recreation of gravel bars and riffles.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37904	Replace hard defence with soft engineering	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37932	Install fish pass in conjuction with Hydropower proposal at Shiplake weir.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37933	In-channel habitat improvements at Henerton backwater.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37934	Reconnect ditches at Remenham.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37935	Deculvert river at Frog Mill inlet, Bisham Brook and put in bypass channel around 2 weirs.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37939	GB106039023233 Create riffles and side streams.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37950	GB106039023233 Create small riffles, re-profile banks, fence watercourses and put in buffer strips throughout.	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames (Reading to Cookham)	37961	GB106039023233 Secure habitat creation through development	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	21194	GB106039030331 Create small riffles, re-profile banks, fence watercourses, buffer strips throughout	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37923	Where possible, improve and protect small tributaries coming into the Thames.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37924	Create wetland and improve floodplain connectivity at Cleeve	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37925	Restrict navigation to one side of poplar island and Appletree Eyot island.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37926	Create wetland habitat at Tilehurst on left hand bank.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37927	Pursue gains through the planning process around the Reading area.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37928	Habitat gains and bank improvements in conjunction with bridge construction	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames Wallingford to Caversham	37929	Improve connection with the river at Reading Marina.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37942	GB106039030331 Create riffles and side streams.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37944	Identify areas that could be connected to the floodplain	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37945	Limit dredging activities by Navigation/ Waterways at significant shallows on onside of bend	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37946	Maintain habitat at the tail of Benson Weir.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37947	Protection of sandy beach features downstream of Wallingford Bridge.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37948	Protect gravels at the confluences of the Bradfords Brook and Mill Brook and with the Thames	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37951	Opening up of backwater near South Stoke STW	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames Wallingford to Caversham	37952	Protection of the sediment deposits in Cleeve Weirpool.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37953	Protection of shallows at head and tail of islands near Beale Park.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37954	Protection of flow dependant habitat in Whitchurch Weirpool.	Out – Project does not prevent the implementation of the Mitigation Measure and has the potential to support this measure.
Thames Wallingford to Caversham	37955	Protection of margins on right hand bank below Whitchurch bridge for 150 – 200 m.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37956	Protection of margins either side of Sulham Brook to Thames confluence.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37958	Protection of weirpool habitat at Mapledurham Lock.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37959	Preservation of river margins beside railway line near Purley/Tilehurst.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37960	Protection of gravel shoal at Caversham weir	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames Wallingford to Caversham	37962	Protection of shallow area on bend downstream of Caversham weir.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37964	GB106039030331 Secure habitat creation through development	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37965	Bank reprofiling (rehabilitation) throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37966	Create shallow margin in front of hard defence throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37967	Removal of hard engineering structures (e.g. naturalisation) throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37968	Replace existing structures throughout the water body with new structural designs	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37969	GB106039030331 Replace hard defence with soft engineering throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames Wallingford to Caversham	37970	Use of engineering techniques to assist natural recovery throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37971	Use soft engineering techniques throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37972	Create compensation habitats throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37973	GB106039030331 Narrow over-wide channels throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37974	Reconnect and restore historic aquatic habitats throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37975	River bed raising or lowering (regrading) throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37976	Provide fish passage solutions throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37977	Bank reprofiling (rehabilitation) for the stretch of the Thames downstream of Wallingford	Out – Project does not prevent the implementation of the Mitigation Measure

HMWB WFD water body	Action ID	Mitigation Measure	Scoping – justification
Thames Wallingford to Caversham	37978	Introduction of stock-proof fencing to reduce bankside erosion	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37979	Change operational regime of weirs and locks to protect and enhance flows and habitats	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37980	GB106039030331 Introduce riparian vegetation/green corridors throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37981	Retain marginal vegetation throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37982	Modify existing structures throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37983	Cessation of maintenance throughout the water body.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37984	If dredging occurs, strategically place dredged material.	Out – Project does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37985	Work with landowners to optimise sensitive management practices.	Out – Project does not prevent the implementation of the Mitigation Measure

Appendix B Water body impact assessment spreadsheet summaries

- The following pages set out the Stage 1 screening and Stage 2 scoping assessments only.
- Detailed assessments for individual water bodies are provided in the accompanying Appendix to Supporting Document C1.

Stage 1 Screening

Project Name: SESRO Gate 3

Screening assessment

The most recent status information is provided in columns D and E. Where data is not available for the most recent year (2022) the next available data is used.

			Surface Water			Groundwater					
Water body Name	**Water body ID**	**Most Recent Overall Status**	**Ecological Status**	**Chemical Status**	**Hydromorphological Designations**	**Quantitative**	**Chemical (GW)**	**Reasons for not achieving Good**	**Linked Protected Areas (name - id - directive)**	**Screened in/out**	**Reasons for Screening out**
Ock and tributaries (Land Brook confluence to Thames)	GB106039023430	Poor (2019)	Poor (2022)	Does not require assessment (2022) Fail (2019)	Not designated A/HMWB	N/A	N/A	•Point source – continuous and intermittent sewage discharge from the Water Industry responsible for Phosphate; •Diffuse source – poor livestock and nutrient management in the agriculture and rural land management category responsible for Phosphate; •Physical modification – land drainage and barriers to ecological discontinuity from agriculture and land use management responsible for fish; •Unknown (pending investigation) – sector under investigation responsible for PFOS; and •Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Upper Thames (Leach to Evenlode) - SWSGZ4012 - Safeguard Zone THAMES (LEACH TO EVENLODE) NVZ - S482 - Nitrates Directive Ock and tributaries (Land Brook confluence to Thames) NVZ - S681 - Nitrates Directive	In	Lies directly within the reservoir footprint
Cow Common Brook and Portobello Ditch	GB106039023360	Poor (2019)	Poor (2019)	Does not require assessment (2022) Fail (2019)	Not designated A/HMWB	N/A	N/A	•Point source – continuous sewage discharge from urban and transport and domestic general public responsible for Macrophytes and Phytobenthos Combined, Phosphate and Dissolved Oxygen; •Diffuse source – poor livestock and nutrient management in the agriculture and rural land management category responsible for Macrophytes and Phytobenthos Combined, Phosphate and Dissolved Oxygen; •Physical modification – land use (arable) in the agriculture and rural land management category responsible for invertebrates; •Natural – drought responsible for dissolved oxygen and other natural conditions responsible for invertebrates; •Suspect data – responsible for Macrophytes and Phytobenthos Combined; and •Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Ock and tributaries (Land Brook confluence to Thames) NVZ - S681 - Nitrates Directive	In	Lies directly within the reservoir footprint
Childrey Brook and Norbrook at Common Barn	GB106039023380	Poor (2019)	Poor (2022)	Does not require assessment (2022) Fail (2019)	Not designated A/HMWB	N/A	N/A	•Point source – sewage discharge both intermittent and continuous from the water industry responsible for Phosphate, and Macrophytes and Phytobenthos Combined; •Diffuse source – poor livestock management in the agriculture and rural land management category responsible for Phosphate, and Macrophytes and Phytobenthos Combined; •Physical modification – land use (arable) in the agriculture and rural land management category responsible for Macrophytes and Phytobenthos Combined; and •Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Ock and tributaries (Land Brook confluence to Thames) NVZ - S681 - Nitrates Directive	In	Lies directly within the reservoir footprint
Sandford Brook (source to Ock)	GB106039023410	Poor (2019)	Poor (2019)	Does not require assessment (2022) Fail (2019)	Not designated A/HMWB	N/A	N/A	•Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Upper Thames (Leach to Evenlode) - SWSGZ4012 - Safeguard Zone Ock and tributaries (Land Brook confluence to Thames) NVZ - S681 - Nitrates Directive Cothill Fen - UK0012889 - Special Area of Conservation	In	Lies directly within the reservoir footprint
Ginge Brook and Mill Brook	GB106039023660	Moderate (2019)	Moderate (2022)	Does not require assessment (2022) Fail (2019)	Not designated A/HMWB	N/A	N/A	•Point source – continuous sewage discharge from the Water Industry responsible for Macrophytes and Phytobenthos Combined and Phosphate; •Other pressures – responsible for Macrophytes and Phytobenthos Combined; •Unknown (pending investigation) – sector under investigation responsible for PFOS; and •Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Berkshire Downs - G87 - Nitrates Directive THAMES (LEACH TO EVENLODE) NVZ - S482 - Nitrates Directive Ginge Brook and Mill Brook NVZ - S469 - Nitrates Directive	In	Lies directly within the reservoir footprint

Thames (Evenlode to Thame)	GB106039030334	Moderate (2019)	Poor (2022)	Does not require assessment (2022) Fail (2019)	Not designated A/HMWB	N/A	N/A	•Point source – continuous sewage discharge from the Water Industry responsible for Phosphate and Tributyltin Compounds (as of 2019 Tributyltin compounds are now at Good status, so no longer an issue); •Diffuse source – poor nutrient management in the agriculture and rural land management category responsible for Phosphate; •Invasive non-native species – North American signal crayfish responsible for invertebrates; •Suspect data – responsible for invertebrates; •Unknown (pending investigation) – sector under investigation responsible for PFOS; and •Measures delivered to address reason, awaiting classification, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Little Wittenham - UK0030184 - Special Area of Conservation Thames Wallingford to Caversham NVZ - S481 - Nitrates Directive River Thames - UKENRI17 - Urban Waste Water Treatment Directive THAMES (LEACH TO EVENLODE) NVZ - S482 - Nitrates Directive Ginge Brook and Mill Brook NVZ - S469 - Nitrates Directive Northfield Brook (Source to Thames) at Sandford NVZ - S477 - Nitrates Directive Wolvercote Mill Stream - UK11946 - Bathing Water Directive Oxford Meadows - UK0012845 - Special Area of Conservation	In	New abstraction and discharge required within this WFD catchment.
Thames Wallingford to Caversham	GB106039030331	Moderate (2019)	Moderate (2022)	Does not require assessment (2022) Fail (2019)	HMWB	N/A	N/A	•Point source – continuous sewage discharge from the Water Industry responsible for Phosphate; •Diffuse source – from agriculture and rural land management for Phosphate; •Physical modification – in the categories of Recreation, Navigation and Local and Central Government responsible for Mitigation Measures Assessment; •Unknown (pending investigation) – sector under investigation responsible for Benzo(g-h-i)perylene, Benzo(b)fluoranthene and PFOS; and •Measures delivered to address reason, awaiting recovery, no sector responsible for mercury and its compounds and PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Berkshire Downs - G87 - Nitrates Directive Little Wittenham - UK0030184 - Special Area of Conservation Thames Wallingford to Caversham NVZ - S481 - Nitrates Directive River Thames - UKENRI17 - Urban Waste Water Treatment Directive	In	Lies within the hydrological zone of influence of altered abstractions and discharges.
Thames (Reading to Cookham)	GB106039023233	Moderate (2019)	Moderate (2022)	Does not require assessment (2022) Fail (2019)	HMWB	N/A	N/A	•Point source – continuous sewage discharge from the Water Industry responsible for Phosphate; •Physical modification – in the categories of Recreation and Navigation responsible for Mitigation Measures Assessment; •Unknown (pending investigation) – sector under investigation responsible for Benzo(g-h-i)perylene, Benzo(b)fluoranthene and PFOS; and •Measures delivered to address reason, awaiting recovery, no sector responsible for PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone Sheeplands - G88 - Nitrates Directive River Thames - UKENRI17 - Urban Waste Water Treatment Directive	In	Lies within the hydrological zone of influence of altered abstractions and discharges.
Thames (Cookham to Egham)	GB106039023231	Moderate (2019)	Moderate (2022)	Does not require assessment (2022) Fail (2019)	HMWB	N/A	N/A	•Point source – continuous and intermittent sewage discharge from the Water Industry responsible for Phosphate; •Diffuse source – poor nutrient management in the agriculture and rural land management category and Transport Drainage in the urban and transport sector responsible for Phosphate; •Physical modification – by local and central government, the water industry and for navigation responsible for Mitigation Measures Assessment; •Unknown (pending investigation) – sector under investigation responsible for PFOS; and •Measures delivered to address reason, awaiting recovery, no sector responsible for PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone South West London Waterbodies - UK9012171 - Special Protection Area South West London Waterbodies - UK11065 - Ramsar Site Roundmoor Ditch and Boveney Ditch NVZ - S466 - Nitrates Directive River Thames - UKENRI17 - Urban Waste Water Treatment Directive Thames (Cookham to Egham) - UKGB106039023231 - Drinking Water Protected Area	In	Lies within the hydrological zone of influence of altered abstractions and discharges.
Thames (Egham to Teddington)	GB106039023232	Poor (2019)	Poor (2022)	Does not require assessment (2022) Fail (2019)	HMWB	N/A	N/A	•Point source – continuous sewage discharge from the Water Industry responsible for Macrophytes and Phytobenthos Combined, Phosphate and Temperature; •Diffuse source – poor nutrient management in the agriculture and rural land management category responsible for Macrophytes and Phytobenthos Combined and Phosphate. Transport Drainage in the urban and transport sector responsible for Phosphate; •Physical modification – by local and central government, the water industry and for navigation responsible for Mitigation Measures Assessment. Water level management in impounded water bodies responsible for temperature; •Flow – low flow (not drought) responsible for temperature; •Unknown (pending investigation) – sector under investigation responsible for PFOS; and •Measures delivered to address reason, awaiting recovery, no sector responsible for PBDE.	Lower Thames (Cookham Egham Teddington) - SWSGZ4016 - Safeguard Zone South West London Waterbodies - UK9012171 - Special Protection Area South West London Waterbodies - UK11065 - Ramsar Site River Thames - UKENRI17 - Urban Waste Water Treatment Directive Thames (Egham to Teddington) - UKGB106039023232 - Drinking Water Protected Area	In	Lies within the hydrological zone of influence of altered abstractions and discharges.

Shrivenham Corallian	GB40602G600600	Good (2019)	N/A	N/A	N/A	Good	Good	None. All achieve Good	Thames (Churn to Coln) NVZ - Nitrates Directive Shrivenham Lower Greensand NVZ - Nitrates Directive Cole (Acorn Bridge to South Marston Brook) NVZ - Nitrates Directive THAMES (LEACH TO EVENLODE) NVZ - Nitrates Directive Ock and tributaries (Land Brook confluence to Thames) NVZ - Nitrates Directive Tuckmill Brook and tributaries NVZ - Nitrates Directive Highworth Corallian NVZ - Nitrates Directive Filchhampstead Brook at Farmoor NVZ - Nitrates Directive Wadley Stream (Source to Thames at Duxford) NVZ - Nitrates Directive Cothill Fen - Special Area of Conservation Shrivenham Corallian - Drinking Water Protected Area	Out	Although the proposed project access road extended north towards the groundwater body, the alignment ensures it does not directly or indirectly interact with the groundwater body. The proposed Project is also not anticipated to impact on groundwater dependant terrestrial ecosystems.
Vale of White Horse Chalk	GB40601G601000	Poor (2019)	N/A	N/A	N/A	Good	Poor	•Point source – landfill leaching from industry responsible for general chemical test. •Diffuse source – poor nutrient management in the agriculture and rural land management category responsible for general chemical test and trend assessment.	S571 - Nitrates Directive Ock and tributaries (Land Brook confluence to Thames) NVZ - S681 - Nitrates Directive Mill Brook and Bradfords Brook system, Wallingford NVZ S682 - Nitrates Directive Willow Brook (Bristol Avon and North Somerset) NVZ - S819 - Nitrates Directive South Wessex - G151 - Nitrates Directive MANOR ROAD (WANTAGE) - GWSGZ0192 - Safeguard Zone Berkshire Downs - G87 - Nitrates Directive Shepherds Shore - GWSGZ0254 - Safeguard Zone Cherhill - GWSGZ0297 - Safeguard Zone Vale of White Horse Chalk - UKGB40601G601000 - Drinking Water Protected Area Ginge Brook and Mill Brook NVZ - S469 - Nitrates Directive Little Wittenham - UK0030184 - Special Area of Conservation Tuckmill Brook and tributaries NVZ - S456 - Nitrates Directive Moor Ditch and Ladygrove Ditch NVZ - S468 - Nitrates Directive Thames Wallingford to Caversham NVZ - S481 - Nitrates Directive Thames (Churn to Coln) NVZ - S457 - Nitrates Directive Cholsey Brook and tributaries NVZ - S467 - Nitrates	Out	The groundwater body is located c.1.6 km south of the footprint and is seperated from the water environment of the site by multiple unproductive formations: the Ampthill Clay Formation, Kimmeridge Clay Formation and the Gault Formation. The proposed Project's indicative location ensures it does not directly or indirectly interact with the groundwater body, as the groundwater flow in the aquifer is to the south of the Project. The proposed Project is also not anticipated to impact on groundwater dependant terrestrial ecosystems.

Stage 2 Scoping

Project Name: SESRO Gate 3
Scoping assessment

Water body Name	Watercourse	Proposed Project type	Project activity	Project activity design details (if applicable)	Scoped in/out	Reasons for Scoping in/out	Direct loss or alterations to open channel or associated habitats	Shading	Changes in flow volumes	Changes in water quality outfalling to the receptor	Creation of new habitats	Enhancement of existing habitats	Changes in surface water quality due to below ground structures	Changes in surface water quantity due to below ground structures	Shading	Changes in flow volumes	Changes in water quality outfalling to the receptor	Enhancement of existing habitats	Changes in surface water quality due to below ground structures	Changes in surface water quantity due to below ground structures	Changes in flow volumes	Changes in water quality outfalling to the receptor	Enhancement of existing habitats	Changes in surface water quality due to below ground structures	Direct loss or alterations to open channel or associated habitats	Shading	Changes in flow volumes	Enhancement of existing habitats	Changes in flow volumes	Changes in water quality outfalling to the receptor	Enhancement of existing habitats	Changes in surface water quality due to below ground structures	Changes in surface water quantity due to below ground structures
Ock and tributaries (Landmead Brook confluence to Thames)	River Ock	Embedded mitigation	Watercourse realignment	1.3 km of watercourse realignment.	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland ditch habitat around the River Ock and Landmead Ditch realignment including wet woodland habitat which are connected directly to the River Ock diversion.	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Access roads and ancillary infrastructure	New clear span bridge	Loss of watercourse as a result of clear span bridge for access road.	In	Physical changes to watercourse could have biological impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Unnamed Ordinary Watercourse	Access roads and ancillary infrastructure	New box culvert	Loss of 0.02 km of watercourse as a result of new culvert required for access track	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cow Common Brook and Portobello Ditch		Watercourse lost to reservoir footprint	Reservoir footprint and associated Cow Common Brook Diversion	4.7 km of watercourse diversion taking the Cow Common Brook and tributaries around the west of the reservoir footprint.	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Cow Common Brook	Embedded mitigation	Habitat creation	Creation of wetland habitat around the Cow Common Brook diversion, including: Wetland habitat, which are connected directly to the Cow Common Brook diversion	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Access roads and ancillary infrastructure	New box culvert Reservoir footprint and associated Cow Common Brook Diversion	Loss of watercourse as a result of new culvert on the Cow Common Brook Diversion required for access track. 0.94 km of watercourse diversion taking the	In	Potential biological and hydromorphological impacts to the watercourse. Potential biological, physico-chemical,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Portobello Ditch	Watercourse lost to reservoir footprint	Common Brook Diversion	Portobello Ditch and tributaries around the west of the reservoir footprint.	In	hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland habitat connected to the Cow Common Brook diversion (which is formed in part by the diversion of Portobello Ditch)	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Watercourse Realignment	~0.4 km long section at the downstream end of Landmead Ditch flowing into the River Ock.	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Landmead Ditch	Watercourse lost to reservoir footprint	Reservoir footprint and associated Cow Common Brook Diversion	The upstream extent of Landmead Ditch (1.7km) will be lost as a result of the reservoir footprint along with changes in flow as a result of the	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Mere Dyke	Embedded mitigation	Watercourse realignment	Watercourse realignment of 6.43 km to flow into the new Mere Dyke Diversion.	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland habitat around the Mere Dyke Diversion including wet woodland habitat which are connected directly to the Mere Dyke diversion.	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Access roads and ancillary infrastructure	New box culvert	Loss of watercourse as a result of new culvert required for access track	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Mere Dyke East	Watercourse lost to reservoir footprint	N/A	N/A	N/A	Watercourse to be retained with no impacts anticipated	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Old Canal	Access roads and ancillary infrastructure	New box culvert	Loss of ~0.02 km of watercourse as a result of new culvert required for access track	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Watercourse lost to reservoir footprint	Watercourse lost (as a result of reservoir footprint)	~0.507 km section of the Old Canal downstream of western watercourse diversion will be lost as a result of the reservoir footprint.	In	Loss of watercourses will have potential biological and hydromorphological impacts as well as potentially altering flow volumes.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Mere Dyke West	Watercourse lost to reservoir footprint	Reservoir footprint and associated Mere Dyke Diversion	Watercourse diversion taking the Mere Dyke West and tributaries around the east of the reservoir footprint to contribute to the Mere Dyke	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland habitat around the Mere Dyke Diversion including wet woodland habitat which are connected directly to the Mere Dyke.	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Orchard Farm Ditch	Watercourse lost to reservoir footprint	Reservoir footprint and associated Mere Dyke Diversion	Ditch and tributaries around the east of the reservoir footprint to contribute to the Mere Dyke	In	hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Access roads and ancillary infrastructure	New box culvert	Loss of ~0.03 km of watercourse as a result of one box culvert for a new road.	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland habitat around the Mere Dyke Diversion including wet woodland habitat which are connected directly to the Mere Dyke. Watercourse diversion taking the Gosse Willow Ditch and tributaries around the east of the reservoir footprint to contribute to the Mere Dyke	In	Biological impacts to watercourse as a result of newly created habitat(s) Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Watercourse lost to reservoir footprint	Reservoir footprint and associated Mere Dyke Diversion		In		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Gosse Willow Ditch	Embedded mitigation	Habitat creation	Creation of wetland habitat around the Mere Dyke Diversion including wet woodland habitat which are connected directly to the Mere Dyke.	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Watercourse lost to reservoir footprint	Reservoir footprint and associated Mere Dyke Diversion	Watercourse diversion taking the Gosse Willow Ditch West and tributaries around the east of the reservoir footprint to contribute to the Mere Dyke	In	Potential biological, physico-chemical, hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Steventon Ditch West	Access roads and ancillary infrastructure	New box culvert	Loss of ~0.02 km of watercourse as a result of one box culvert for a new road.	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland habitat around the Mere Dyke Diversion including wet woodland habitat which	In	Biological impacts to watercourse as a result of newly	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Steventon Ditch East	Watercourse lost to reservoir footprint	N/A	are connected directly to the Mere Dyke	In	created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Watercourse lost to reservoir footprint	Watercourse lost (as a result of reservoir footprint)	Unnamed ordinary watercourses will be lost as a result of the reservoir footprint.	In	Watercourses to be retained with no impacts anticipated Loss of watercourses will have potential biological and hydromorphological impacts as well as potentially altering flow volumes.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chibley Brook and Norbrook at Common Barn	Unnamed ordinary watercourses	Access roads and ancillary infrastructure	New box culvert	Loss of watercourse as a result of one box culvert for a new road.	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Chibley Brook	Watercourse to be retained	N/A	N/A	N/A	Watercourse to be retained with no impacts anticipated	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Watercourse lost to reservoir footprint	Watercourse diversion of 3.39 km to flow into the		In	Potential biological, physico-chemical,	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	East Hanney Ditch	Watercourse lost to reservoir footprint	East Hanney Ditch Diversion	new East Hanney Ditch Diversion.	In	hydromorphological, chemical, and specific pollutant impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Embedded mitigation	Habitat creation	Creation of wetland habitat around the East Hanney Ditch realignment including wet woodland habitat which are connected directly to the realignment.	In	Biological impacts to watercourse as a result of newly created habitat(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Access roads and ancillary infrastructure	New box culvert Watercourse lost (as a result of reservoir footprint)	Loss of 0.104 km of watercourses as a result of new box culverts for new Steventon Road and Old Steventon Road 0.19 km of unnamed ordinary watercourses will	In	Potential biological and hydromorphological impacts to the watercourse. Loss of watercourses will have potential biological and	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chibley Brook and Norbrook at Common Barn	Unnamed ordinary watercourses	Watercourse lost to reservoir footprint		be lost as a result of the reservoir footprint.	In	hydromorphological impacts as well as potentially altering flow volumes.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sandford Brook (source to Ock)	Sandford Brook	Access roads and ancillary infrastructure	New clear span bridge	Loss of watercourse as a result of clear span bridge for road widening to accommodate access.	In	Physical changes to watercourse could have biological impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Unnamed ordinary watercourses (SBO	Access roads and ancillary infrastructure	New box culvert	Loss of 0.03 km of watercourse as a result of new box culvert for road widening to accommodate access.	In	Potential biological and hydromorphological impacts to the watercourse.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ginge Brook and Mill Brook	Ginge Brook and Mill Brook	No activity within this water body	N/A	N/A	N/A	Watercourses within this catchment to be retained with no impacts anticipated	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thames (Eventside to Thame)	River Thames	Intake/outfall infrastructure	Augmentation	Discharge into water body from SESRO causing change in flows within the River Thames	In	Potential changes in flow regime and water quality outfalling to the River Thames could have ecological and chemical impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Intake/outfall infrastructure	Abstraction	Abstraction in upstream water body to supply SESRO causing change in flows within the River Thames	In	Potential changes in flow regime could have ecological and chemical impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		New intake/outfall	New intake/outfall structure	New outfall to accommodate discharge from SESRO	In	Physical alteration to WFD water body could have ecological impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thames Wallingford to Caversham	River Thames	Intake/outfall infrastructure	Augmentation	Discharge into water body from SESRO causing change in flows within the River Thames	In	Potential changes in flow regime and water quality outfalling to the River Thames could have ecological and chemical impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		Intake/outfall infrastructure	Abstraction	Abstraction in upstream water body to supply SESRO causing change in flows within the River Thames	In	Potential changes in flow regime could have ecological and chemical impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thames (Reading to Cookham)	River Thames	Intake/outfall infrastructure	Augmentation	Discharge into water body from SESRO causing change in flows within the River Thames	In	Potential changes in flow regime and water quality outfalling to the River Thames could have ecological and chemical impacts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

		Intake/outfall infrastructure	Abstraction	Abstraction in upstream water body to supply SESRO causing change in flows within the River Thames	In	Potential changes in flow regime could have ecological and chemical impacts.	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗
Thames (Cookham to Egham)	River Thames	Intake/outfall infrastructure	Augmentation	Discharge into water body from SESRO causing change in flows within the River Thames	In	Potential changes in flow regime and water quality outfalling to the River Thames could have ecological and chemical impacts.	✗	✗	✓	✓	✗	✗	✗	✗	✗	✓	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✓	✗	✓	✓	✗	✗	✗
		Intake/outfall infrastructure	Abstraction	Abstraction in upstream water body to supply SESRO causing change in flows within the River Thames	In	Potential changes in flow regime could have ecological and chemical impacts.	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗
Thames (Egham to Teddington)	River Thames	Intake/outfall infrastructure	Augmentation	Discharge into water body from SESRO causing change in flows within the River Thames	In	Potential changes in flow regime and water quality outfalling to the River Thames could have ecological and chemical impacts.	✗	✗	✓	✓	✗	✗	✗	✗	✗	✓	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗	✗	✓	✗	✓	✓	✗	✗	✗
		Intake/outfall infrastructure	Abstraction	Abstraction in upstream water body to supply SESRO causing change in flows within the River Thames	In	Potential changes in flow regime could have ecological and chemical impacts.	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✗

Project Name: SESRO Gate 3

Scoping assessment - Mitigation Measures and Programme of Measures

Mitigation Measures for Heavily Modified water bodies

Water body	Action ID	Measure	Scoping - justification
Thames (Cookham to Egham)	37863	Multi-Species fish pass installation at Boulters mill channel & weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37864	Replace hard banks and establish shallows and emergent plants.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37865	Upgrade to multi species fish pass at Bray SU9092579733	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37866	Pigeonhill Eyot/bray mill stream phase two enhancement. SU9097779649	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37867	Connect Windsor Marina Lakes to Thames	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37868	Beach Recharge, import coarse material to dress existing beach areas along river.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37869	Eton backwater Restoration. Improve in lateral connectivity to floodplain habitat.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37870	Create a fish and wildlife channel at Old Windsor Weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37871	Create a fish and wildlife channel at Bell Weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37872	Create a fish and wildlife channel at Hedsor Weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37873	Modify sluice at Bray Mill.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37874	Install fish screen to stop entrainment, TW Datchet intake	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37875	Fish screen to stop entrainment, Sunnymeads intake, Datchet	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37876	Fish screen to stop entrainment, Hythe End intake	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37877	Fish screen to stop entrainment, Egham intake	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37878	Engaging with navigation users to reduce bank erosion and sediment input	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37889	Canoe fish connection through Papermill site	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37890	Amerden Stream. Augment flow using jubilee river and associated in channel enhancement work	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37891	Old Mill sluice could be modified to change the flow SU9097779649	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37892	Naturalisation of right bank of Monkey island	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37893	Managed retreat on the towpath opposite Ruddles Pool SU9373377203	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37914	Reprofile the river bank, plant vegetation and create beaches.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37915	Improve fish passage at Boveney Weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37916	Move impoundment structures upstream at Clewer Mill Stream	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37917	Install fish passes and habitat works at Tangier Mill Stream	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37918	Habitat enhancement through Eton College	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37919	Strategic placement of dredged material.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Cookham to Egham)	37920	Strategic placement of dredged material at Lower Chalvey Ditch	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	36930	Thames (Egham to Teddington)	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37804	Restore backwater at Riverbank residential development, Staines .	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37805	Penton Hook marina create 2.5 hect BAP habitat.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37806	Restoration of backwaters at Truss's island.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37807	Enhance and extend natural bank at Silver sands, Egham TQ0364869740	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37808	Add shelter at gravel pit Penton Hook for fish shelter TQ0412869338	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37809	Backwater enhancements at Mixnams Island Penton Hook TQ0429568586	Out - Scheme does not prevent the implementation of the Mitigation Measure

Thames (Egham to Teddington)	37810	Enlarging Penton Hook backwater on north bank TQ0438969492	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37811	Selective opening up of right bank at Laleham. Create beach areas TQ0491168870	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37812	reduce the wash by having signs to reduce boat speed - Waterways	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37813	Laleham Identify piece meal bankwork for removal.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37814	Ensure water company modify fish screen at Laleham intake.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37815	Burway Ditch, Abbey mead some floodplain grazing marsh possible TQ0469667521.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37816	Remove Abbey Chase weir on Abbey River and install stoplogs which can be removed over time	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37817	Dockett Eddy enhance reinforced bank, work is located on left bank - F & B TQ0659166278	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37818	Create wetland and backwater habitats and enhance riverbank	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37819	Compensatory habitat at Desborough Island	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37820	Habitat Improvement in Backwater from Desborough Cut into Shepperton.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37821	Install mitigation if hydropower is installed on left bank	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37822	Sunbury depot island create reed bed to create BAP habitat TQ1029367893	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37823	Walton 2 intake - screening on intake to prevent fish entrapment	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37824	LTS Molesey weir - fish pass to replace fish trap finishes 2014 TQ1508968738	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37825	Install new channel to provide access to tributary and create functional flow dependent habitat	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37826	Canbury Gardens:- 1 mile of natural riverbank, beaches and habitat to rivers edge.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37827	Broom Road Teddington Natural Beach next to the recreation ground - TLS Project proposed	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37828	LTS - Teddington weir, new 2 stage fish pass proposed with hydropower scheme TQ1697971418	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37829	Redevelopment of Marina may have possible habitat enhancement	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37839	River bed raising or lowering.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37840	Create low flow channels in over-widened/over-depended channels	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37841	GB106039023232 Create reed fringes	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37842	Create shallow margin in front of hard defence	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37843	Backwater creation/enlargement at Penton Hook	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37844	Narrow over-wide channels, Sunbury lock and weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37845	Narrow over-wide channels, Penton Hook pit	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37846	Reconnect and restore historic aquatic habitats, Penton Hook pit	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37847	Reconnect and restore historic aquatic habitats. Covered by WTh_Low_001897	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37848	Recreate a sinuous river channel (re-meandering), Abbey River	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37849	Recreate a sinuous river channel (re-meandering), Hurst Park	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37850	GB106039023232 Recreate a sinuous river channel (re-meandering)	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37851	Removal of hard engineering structures (e.g. naturalisation)	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37852	GB106039023232 Replace existing structures with new structural designs	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37853	Replace hard defence with soft engineering, Sunbury lock and weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37854	Install technical fish pass, Chertsey weir.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37855	Install fish pass, Molesey weir	Out - Scheme does not prevent the implementation of the Mitigation Measure

Thames (Egham to Teddington)	37856	Install fish pass, Tumbling Bay weir, Sunbury	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37857	Install fish screening at Thames Water Laleham intake.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37858	Hampton intake install fishscreens at Thames water intake	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37859	GB106039023232 Engaging with navigation users to reduce bank erosion and sediment input	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37860	Encourage use of environmentally friendly vessel design.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37861	Lateral zoning to concentrate boats within a central channel	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37862	Limit number of mooring permits available	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37879	Design moorings for ecological benefit. E.g. offline revenue moorings.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37880	Sunbury lock and weir. Create fish and wildlife channel through Sunbury Lock Island.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37881	Create wetland and backwater features at Hurst Park	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37882	Wetland and reed bed creation at Penton Hook pit.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37883	Introduce minimum flow limits on abstractions	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37884	Abbey River, Install fishpass at Abbey Chase	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37885	Reconnect and restore historic aquatic habitats, Create compensation habitats	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37886	Penton Hook. Install fish shelters and predator refuge in Penton Hook Pit.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37887	Enhancement opportunities through Penton Hook marina redevelopment.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37888	Removal of hard engineering structures/ bank rehabilitation/reprofiling.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37894	Install fish pass in conjunction with Hydropower proposal at Teddington weir.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37895	Beach Recharge, import gravel to dress selected marginal areas of the watercourse.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37896	Lower weir at Abbey Chase.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37897	Narrow over-wide channels	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37898	GB106039023232 Recreate a sinuous river channel (re-meandering)	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37899	Create a fish and wildlife channel to bypass Chertsey weir.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37900	Install fish pass on Teddington boat rollers, Teddington weir	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37901	Surbiton (Seething wells) intake. Install fishscreen	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37902	Change maintenance technique to minimise disturbance	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37903	Recreation of gravel bars and riffles.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Egham to Teddington)	37904	Replace hard defence with soft engineering	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37932	Install fish pass in conjunction with Hydropower proposal at Shiplake weir.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37933	In-channel habitat improvements at Henerton backwater.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37934	Reconnect ditches at Remenham.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37935	Deculvert river at Frog Mill inlet, Bisham Brook and put in bypass channel around 2 weirs.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37939	GB106039023233 Create riffles and side streams.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37950	GB106039023233 Create small riffles, re-profile banks, fence watercourses and put in buffer strips throughout.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames (Reading to Cookham)	37961	GB106039023233 Secure habitat creation through development	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	21194	GB106039030331 Create small riffles, re-profile banks, fence watercourses, buffer strips throughout	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37923	Where possible, improve and protect small tributaries coming into the Thames.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37924	Create wetland and improve floodplain connectivity at Cleeve	Out - Scheme does not prevent the implementation of the Mitigation Measure

Thames Wallingford to Caversham	37925	Restrict navigation to one side of poplar island and Appletree Eyot island.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37926	Create wetland habitat at Tilehurst on left hand bank.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37927	Pursue gains through the planning process around the Reading area.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37928	Habitat gains and bank improvements in conjunction with bridge construction	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37929	Improve connection with the river at Reading Marina.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37942	GB106039030331 Create riffles and side streams.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37944	Identify areas that could be connected to the floodplain	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37945	Limit dredging activities by Navigation/ Waterways at significant shallows on onside of bend	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37946	Maintain habitat at the tail of Benson Weir.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37947	Protection of sandy beach features downstream of Wallingford Bridge.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37948	Protect gravels at the confluences of the Bradfords Brook and Mill Brook and with the Thames	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37951	Opening up of backwater near South Stoke STW	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37952	Protection of the sediment deposits in Cleeve Weirpool.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37953	Protection of shallows at head and tail of islands near Beale Park.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37954	Protection of flow dependant habitat in Whitchurch Weirpool.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37955	Protection of margins on right hand bank below Whitchurch bridge for 150 - 200m.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37956	Protection of margins either side of Sulham Brook to Thames confluence.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37958	Protection of weirpool habitat at Mapledurham Lock.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37959	Preservation of river margins beside railway line near Purley/Tilehurst.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37960	Protection of gravel shoal at Caversham weir B	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37962	Protection of shallow area on bend downstream of Caversham weir.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37964	GB106039030331 Secure habitat creation through development	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37965	Bank reprofiling (rehabilitation) throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37966	Create shallow margin in front of hard defence throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37967	Removal of hard engineering structures (e.g. naturalisation) throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37968	Replace existing structures throughout the waterbody with new structural designs	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37969	GB106039030331 Replace hard defence with soft engineering throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37970	Use of engineering techniques to assist natural recovery throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37971	Use soft engineering techniques throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37972	Create compensation habitats throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37973	GB106039030331 Narrow over-wide channels throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37974	Reconnect and restore historic aquatic habitats throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37975	River bed raising or lowering (regrading) throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37976	Provide fish passage solutions throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37977	Bank reprofiling (rehabilitation) for the stretch of the Thames downstream of Wallingford	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37978	Introduction of stock-proof fencing to reduce bankside erosion	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37979	Change operational regime of weirs and locks to protect and enhance flows and habitats	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37980	GB106039030331 Introduce riparian vegetation/green corridors throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37981	Retain marginal vegetation throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure

Thames Wallingford to Caversham	37982	Modify existing structures throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37983	Cessation of maintenance throughout the waterbody.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37984	If dredging occurs, strategically place dredged material.	Out - Scheme does not prevent the implementation of the Mitigation Measure
Thames Wallingford to Caversham	37985	Work with landowners to optimise sensitive management practices.	Out - Scheme does not prevent the implementation of the Mitigation Measure

Project Name: SESRO Gate 3

Scoping assessment - Mitigation Measures and Programme of Measures

Programme of Measures for the Thames River Basin District

Measure	Summary Measure information	River Basin District	Management catchment	Operational catchment	Water body name	Scoping - justification
Water Industry Asset Management Plan Price Review 2019 Water Industry National Environment Programme schemes - catchment schemes	Catchment schemes e.g. Farm nutrient management plans and soil testing - improved farming practice	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2019 Water Industry National Environment Programme schemes - water resources	Sustainable abstraction improvements through changes to abstraction licences, licence conditi	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Abstraction Plan delivery - Environment	Greater access to water and sustainable abstraction improvements through: changes to abstraction licences including compulsory and voluntary licence changes, time limited licences renewal, apply powers for serious damage, revocation of unused licences, reducing quantities on under used licences and non licence changes	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Abstraction Plan delivery - Priority Catchments	Working collaboratively with all stakeholders to deliver integrated catchment solutions to mitigate the impact of climate change and unsustainable abstraction. Update Abstraction Licence Strategy with findings from priority catchments by 31 July 2021	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Environment Agency Environment Programme and Flood and Coastal Risk Management capital programme	Diffuse pollution control initiatives, recovery of priority species - habitat restoration or creation and reintroducing species	Thames	Various	Various	Various	Out – The Scheme supports this measure through habitat creation within the Ock catchment and movement from agricultural management practices which could be a source of diffuse pollution.
Water Industry Asset Management Plans Price Review 2019 Water Industry National Environment Programme schemes - sewage	Sewage treatment improvements by changes to licence conditions at specific sites	Thames	Various	Various	Various	Out – The Scheme is not relevant to the implementation of this measure.
Ock Arable Project. **Mechanism = Environment Agency Environment Programme and Flood, Coastal Erosion Risk Management (Flood and Coastal Risk Management) capital programme**	Engage with farmers across the catchment and develop a farmer cluster group to help tackle pollution and improve the water environment.	Thames	Gloucestershire and the Vale	Ock	Ock (to Cherbury Brook), Childrey and Woodhill Brooks	Out – The Scheme is not relevant to this measure as it is specific to a water body scoped out of this assessment.
Aquatic Biosecurity Campaigns	Slowing the introduction and spread of Invasive Non Native Species via public awareness campaigns including Check, Clean, Dry. Funded by the Aquatic Biosecurity Partnership	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Enabling actions and legislation to enforce actions in the European Union Invasive Alien Species Regulation	Various measures controlling Invasive Non Native Species. Enabling actions and legislation to enforce actions in the European Union Invasive Alien Species Regulation	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Great Britain level co-ordination of Invasive Non Native Species actions	Various measures to control Invasive Non Native Species. Co-ordination of Invasive Non Native Species actions and approach via the Great Britain Invasive Non Native Species programme board and strategy	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
National Highways Invasive Non Native Species control work	Various measures to control Invasive Non Native Species by National Highways	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Invasive Non Native Species eradication - national programmes	Various measures to control Invasive Non Native Species. National eradication and control programmes for aquatic Invasive Non Native Species e.g. top mouth gudgeon and water primrose	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Management of invasive non-native species at selected protected sites by Natural England	Various measures to control Invasive Non Native Species. Management of invasive nonnative species at selected protected sites by Natural England	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Invasive Non Native Species Secretariat; co-ordination of alert system, species records, and the Invasive Non Native Species Information Portal	Various measures to control Invasive Non Native Species. Supporting data, evidence and processes to inform Invasive Non Native Species control and management	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Partnership pennywort work - developing a shared strategy	Various measures to control floating pennywort	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency, Natural England and partners will implement rapid responses to contain and eradicate new Invasive Non Native Species invasions, where practicable	Various measures to control Invasive Non Native Species Invasive Non Native Species - rapid response	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Invasive non native species local action groups	Funding and support for local Invasive non native species action groups	Thames	various	various	various	Out - The Scheme does not prevent the implementation of the measure
England Woodland Creation Offer	Tree planting primarily to achieve UK Net Carbon Zero with incentives to target woodland in places with biodiversity, flood, water quality, water resources and climate adaptation benefits	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.

Riparian shade - provide tools and evidence to deliver targeted riparian shading at greater national scale with partners - Keeping Rivers Cool 2 – an England-wide tree shade map	Geographic Information Systems based tool to target woodland creation to provide riparian shade in areas most at need	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Safeguard and create thermal refuges through tree planting/fencing to increase riparian shade	Riparian tree planting and fencing - Seek to safeguard and create thermal refuges through tree planting/fencing to increase riparian shade - target 50,000 trees and 50km fencing in England by 2024	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Water Industry Asset Management Plan Price Review 24 Water Industry National Environment Programme schemes - Habitat improvements	Habitat restoration or creation and species recovery. E.g. river and lake restoration, removal of barriers to fish movement, tackle Invasive Non Native Species, achieve objectives for waterdependent Sites of Special Scientific Interest and European sites, and actions to conserve and enhance priority habitats and species	Thames	Various	Various	Various	Out – The Scheme supports this measure through improvements to aquatic habitats within the Ock catchment.
Maritime Fisheries Fund	Explore opportunity for Maritime Fisheries Fund to support measures to protect migratory fish in the marine environment	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Fisheries Improvement Programme and Wild Trout Trust contract	Various habitat improvement projects to benefit fisheries in partnership will have additional benefits for River Basin Management Plans environmental objectives	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Nature Recovery Network	Various actions to protect, improve, expand, and connect habitats including water and waterdependent environments. Sites designated for nature conservation, such as European sites and Sites of Special Scientific Interest are at the core of this network	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Green Recovery Challenge Fund	Various environmental improvement projects - fish passage; land management change to address pollution; river, lake and wetland restoration; tree planting; peatland restoration. £80 million funding value over two £40million rounds, Round 1 delivery by March 2022, Round 2 by March 2023	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Nature for Climate peatland restoration capital grant scheme	Creation and restoration of peatland - habitat creation and enhancements	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Implement actions required to achieve and maintain objectives for European sites	Implement 'remedies' for the Sites of Special Scientific Interest that underpin water-dependent European sites. Remedies are actions needed to address reasons for adverse condition and restore the site to favourable condition. These are site-specific remedies and agreed between Natural England and the organisation responsible for their delivery on the site. Continue to progress actions identified in Site Improvement Plans. These provide a high level description of issues affecting the condition of a site and identify priority actions required to address the issues	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Lake Restoration Programme for European sites and Sites of Special Scientific Interest	Continue developing and implementing lake restoration plans for European site and Site of Special Scientific Interest lakes e.g. action to improve water quality, advice on nutrient management within the catchment, restoration of natural hydrological regime, restoration of vegetation and natural fish communities, sediment removal	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Wet agriculture and peatlands forestry - Paludiculture Exploration Fund	Providing technical support for new facilitative fund. Enable paludiculture (wetter farming) to become viable as a way of conserving carbon by raising the water table in peat soils, whilst maintaining a (different) peatland agricultural land use	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Delivery of Lowland Agricultural Peat outcomes	Develop strategic position on future for sustainable land use on lowland agricultural peat soils	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
River Restoration Programme for European sites and Sites of Special Scientific Interest	Continue to develop and implement strategic river restoration plans for European sites and Site of Special Scientific Interest rivers	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Improving Fish Passage at Environment Agency Assets	Improving fish passage at Environment Agency assets through opportunities and partnership programme of works approach	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Leaders Group aligned approaches to landscape scale restoration, from soil to sea	Water Leaders Group to act as advocates for landscape-scale restoration of natural processes within our freshwater catchments and coastal waters	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Catchment Sensitive Farming Rural Development Programme England	Various farm infrastructure improvements and wider agricultural practice	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Championing the Farmed Environment - Advice to farmers on environmental improvements	Various measures to prevent impacts from agriculture	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Countryside Stewardship Agri-env, including Water Environment Grant, schemes that run over into 2022 to 2027	Various environmental improvements by farmers and land managers including on farm, river corridor improvements and wider collaborative nature based solutions including Natural Flood Management	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Land Management Schemes	Various environmental improvements by farmers and land managers including on farm improvements to wider collaborative nature based solutions including Natural Flood Management and buffer zones	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Regulation of agricultural and rural land including targeted regulation of protected areas such as Nitrate Vulnerable Zones	Regulation by Environment Agency officers - preventing pollution of nitrates, phosphates and sediment. Increased agricultural regulatory resource secured in 2021 continues to at least 2025. Activity focusses on: compliance with the Farming Rules for Water; compliance with Silage Slurry and Agricultural Fuel Oil Regulations. The aims are:	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

Tried and Tested - Advice to farmers on nutrient management	Agricultural nutrient management	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Diffuse Water Pollution Plans for European sites	Continue progressing implementing Diffuse Water Pollution Plans for European sites where the site condition is affected by diffuse water pollution.	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Nature Based Solutions	Develop a strategic position and associated guidance on Nature Based Solutions, to support our activities and engagement with those working in this area	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Third Adaptation Report and associated actions	Various actions to improve the Environment Agency's approach to adapting to climate change	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Re-fresh of Shoreline Management Plans	The Environment Agency has been working closely with the Coastal Group Network to manage a 'refresh' of the Shoreline Management Plans (SMPs) covering the English coast. The current SMPs were developed between 2006 and 2012. The refresh is not a third cycle of SMPs, but an update to ensure SMPs reflect the most current evidence, experience, and policy. The SMP Refresh project will be completed March 2023.	Thames	Various	Various	All	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Flood Coast Risk Management Coastal Habitat Compensation and Restoration Programme	Environment Agency Flood Coast Risk Management Coastal Habitat Compensation and Restoration Programme	Thames	Various	Various	All	Out - The Scheme does not prevent the implementation of the measure
National Coastal Erosion Risk Map 2	National Coastal Erosion Risk Map 2	Thames	Various	Various	All	Out - The Scheme does not prevent the implementation of the measure
National Network of Regional Coastal Monitoring Programmes	National Network of Regional Coastal Monitoring Programmes	Thames	Various	Various	All	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Flood Coast Risk Management Maintenance Programme	Implement the recent changes to funding policy arrangements, including payment for environmental benefits, the Environmental Statutory Allowance and Nature for Climate funding, to achieve greater environmental co-benefits from projects that manage flood and coastal erosion risk (Timescales: by 2027).	Thames	Various	Various	All	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Flood Coast Risk Management Funding	Implement the recent changes to funding policy arrangements, including payment for environmental benefits, the Environmental Statutory Allowance and Nature for Climate funding, to achieve greater environmental co-benefits from projects that manage flood and coastal erosion risk (Timescales: by 2027).	Thames	Various	Various	All	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Flood and Coastal Risk Management capital programme beyond current confirmed projects	Delivery of mitigation measures for Flood and Coastal Erosion Risk Management assets - river restoration and fish pass improvements	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Navigation Capital Asset Investment	Addressing physical modification on Environment Agency owned regulatory assets to maintain navigable waterways and restore fish passage	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Leaders Group work on integrated investment in catchments	Water Leaders Group develop shared guidance and case studies for integrating investment in and across catchments	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Natural Environment Investment Readiness Fund (NEIF)	Create new woodlands, restore peatlands, create new coastal wetlands, restore freshwaters and wetlands	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Water Leaders Group shared guidance on developing and implementing market approaches to Paid Ecosystem Services	Implement measures through Paid Ecosystem Service markets	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Nature Based Solutions Landscapes Project	A set of demonstration projects to develop the multi-sector funding approach to landscapescale Nature-based Solutions, funded through Shared Outcome Fund	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Environment Transformation (WET) Programme	The Environment Agency to explore more flexible approaches to permitting, to support wider implementation of nature based solution through water industry price review process (PR24) and land managers/agriculture sector.	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
European Union Structural Funded projects that may run over into 2022 to 2027 e.g. European Union Inter Regional Cooperation Programme Projects	Various environmental improvement projects e.g. pollution control initiatives, abstraction management and habitat restoration	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Other Heritage Lottery, Landfill Charge Levy or Philanthropic funded projects that may run over into 2022 to 2027 e.g. European Union Inter Regional Cooperation Programme Projects or Local Enterprise Partnerships funded projects	Various environmental improvement projects e.g. pollution control initiatives, abstraction management and habitat restoration	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
UK Prosperity Fund projects that may run over into 2022-27 e.g. with Local Enterprise Partnerships	Various environmental improvement projects e.g. pollution control, abstraction management and habitat restorations pollution control initiatives	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Explore better data sharing approaches with Arm's Length Bodies and partners	Data sharing restrictions between partners, including Arm's Length Bodies can be a barrier for a holistic targeted approach to regulating, advice and grant aid. Explore better data and evidence sharing approaches	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Championing Coastal Coordination (3Cs) Project Phase 2	Phase 2 - work with coastal partners and other interested parties to review the phase 1 pilots and develop recommendations for a national framework for future governance and joint working to improve alignment of water planning and delivery.	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

Catchment Based Approach	Catchment partnership led projects and measures related to multiple funding streams and outcomes for water quality, quantity, habitat and flood risk reduction. Examples can be seen in the River Basin Management Plan Catchment Partnership Pages	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
Improved Integrated Local Delivery	Working with partners, to improve strategic national engagement for local collective action. Achieve this through better collaborative system governance, alignment and integration from catchment to coast for multiple environmental and social outcomes and climate resilience e.g. towards a national framework for water governance, local estuarine and coastal restoration plans	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Blue Impact Fund - Marine habitat restoration fund bid	Developing ocean trust fund to support marine environmental enhancement	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency programme of work to realise our Ambition for Water	Various measures arising from the Environment Agency reviewing their approach to water and setting out a roadmap for how they will work with partners to deliver our Water Ambition. This will coordinate multiple activities detailed elsewhere in this River Basin Management Plan Programme of Measures spreadsheet	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Environment Improvement Fund	Local habitat/Invasive Non Native Species improvement schemes and agricultural/urban pollution control initiatives. Also funding 2021-22 to support improved coordination of coastalbased partnership working	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Environment Programme beyond current confirmed projects	Diffuse pollution control initiatives, recovery of priority species - habitat restoration or creation and reintroducing species	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Act Targets water and biodiversity	The Environment Act 2021 stipulates the Government will set a minimum of one long-term legally binding targets in four priority areas. These include water, waste and resources, air quality and biodiversity. There will need to be various environmental improvement projects to achieve these targets. The public consultation on the proposed targets closed on 27 June 2022. Those proposed for water include addressing rivers polluted by abandoned metal mines, pollution coming from wastewater; agriculture and to reduce water demand. Biodiversity targets will also aid the environment by halting the decline of species abundance, extinction and creating wildlife-rich habitats in our streams, rivers, estuaries and coastal waters.	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets, creation of wet woodland and improved habitat and through the provision of sustainable abstraction into the future.
Water Leaders Group aligning approaches to behaviour change campaigns on water		Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Development Planning - Statutory Biodiversity net gain	Planning requirement that aims to ensure that developments have a net positive impact on biodiversity overall, by minimising any negative impacts, restoring existing areas or offsetting	Thames	Various	Various	Various	Out – the Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
A new framework of Green Infrastructure Standards supports mainstreaming of good green-blue infrastructure	Various measures that result in greener cities and cleaner waters	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Local Nature Recovery Strategies	Various actions to protect, improve, expand and connect habitats including water and waterdependent environments. These will be identified through the Statement of Biodiversity Priorities and the Local Habitat Map in each Local Nature Recovery Strategy. Actions to restore habitat should seek to deliver wider environmental outcomes such as flood risk mitigation, water quality improvements and climate change adaptation wherever possible	Thames	Various	Various	Various	Out – The Scheme supports this measure through woodland and wet woodland planting with achievement of BNG targets.
National Highways Strategic Road Investment Strategy	Measures to mitigate impacts from road run-off	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

Regulatory campaigns in urban areas including industrial estates and retail parks	Regulation by Environment Agency officers - prevent pollution	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Environment Agency Chief Scientific Advisors Office Clean and Plentiful Water Environmental Quality Standards Project	Environmental Quality Standards development post European Union Exit	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes arising from Chemicals Investigation programme	Sewage treatment improvements through changes to licence conditions at specific sites	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes - catchment	Catchment schemes e.g. Farm nutrient management plans and soil testing - improved farming practice	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Implement findings from review of Polluter Pays/Fair Share project due end of 2021	Price Review/Asset Management Plan	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes - sewage	Sewage treatment improvements through changes to licence conditions at specific sites	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Drainage Waste Water Management Plans to inform measures identified by Water Industry in Price Review24	Integrated drainage management - Measures to address pollution, flood risk and habitat function	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

Abstraction plan 2 - Refreshed Sustainable abstraction plan delivery	Measures include: changes to abstraction licences including compulsory and voluntary licence changes, time limited licences renewal, application of powers in relation to actual and risk of serious damage, risk of deterioration and actual deterioration, revocation of unused licences, and reducing quantities on under used licences and non licence changes, delivery of a stronger catchment focus updating Abstraction Licence Strategies	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Achieve sustainable abstraction to deliver resilient catchments and meet the challenge of climate change	Greater clarity on un-sustainable abstraction improvements through: changes to abstraction licences for example time limited licences, serious damage, unused licences, new authorisations. New licences issued only to the sustainability standards of the flow and groundwater objective thresholds as consulted. Deviation from this only by agreed quality of scientific evidence, provided at the developers cost	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Develop Environmental Destination statements. Establish a consistent understanding of the long term water resource needs and climate change impacts	Environmental destination statement informs regional planning options and on the ground measures	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Implementation of a stronger catchment focus for water resources	Working collaboratively with all stakeholders to deliver integrated catchment solutions to mitigate the impact of climate change and unsustainable abstraction. Where appropriate deliver innovative solutions to increase access to water and sustainable abstracting improvements and update all Abstraction Licencing System by 2027	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Modernise our abstraction licensing service to deliver resilient and sustainable catchments and to meet the challenge of climate change	Access to water and sustainable abstraction improvements through modernising the abstraction service. Ending exemptions, moving to a digital platform and introducing Environmental Permitting Regulation and a stronger regulatory and compliance regime based on delivering sustainable abstraction	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
New Authorisations - previously Exempt Licence determinations by December 2023	Abstractions Licensed and established for review against sustainability standards at Common End Dates against surface and groundwater sustainability tests	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Review of Heavily Modified Waterbody and Level Managed system flow objectives to assure achievement of sustainable abstraction and ecosystems they support.	Establish sustainable flow objectives for Heavily Modified Water Bodies and Level Managed Systems to identify unsustainable abstraction and establish these thresholds for licensing and the associated groundwater sustainability for licence reviews	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Development of Regional Plans Water Resources and environmental destination statement	Give the water sector a stronger strategic steer on long term water resources planning. Includes: coordinating Regional planning groups and setting the environmental destination. Also inform the development of new water infrastructure and design future regulatory frameworks. Do this through RAPID (Regulators' Alliance for Progressing Infrastructure Development) Abstraction Licence reductions to deliver Sustainable Abstraction. This is a key measure in our response to climate change	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future which follows the RAPID guidance. Therefore, no potential for prevention of this measure.
Time Limited Abstraction Licence renewal - Give licence holders six years notice of renewal	Licence holders have six years notice to renew time limited licences. To meet the sustainability test, the Environment Agency will mainly prioritise action to prevent deteriorations up to the end of 2027	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water Resource Assets Capital Investment	Ensure water transfer schemes are safe, resilient, environmentally sustainable and can operate when required	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
Water Industry Asset Management Plan Price Review 2024 Water Industry National Environment Programme schemes - water resources	Sustainable abstraction improvements through changes to abstraction licences and licence conditions at specific sites	Thames	Various	Various	Various	Out - The Scheme supports this measure through provision of sustainable abstraction into the future. Therefore, no potential for prevention of this measure.
The Flood and Coastal Resilience Innovation Programme - 25 projects targeting flood resilience	Various measures to improve flood resilience, which may include:	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
As part of Water Ambition the Environment Agency will work with partners to bring a particular focus on protecting and improving chalk rivers	Various regulatory and partnership measures to improve and protect chalk rivers - quality, quantity, habitat and biodiversity	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
OxCam Arc - Working with the wider Defra group to influence the Spatial framework and wider OxCam work.	Ensuring we use planned growth and development as an opportunity for improving nature. Influencing planning policy, influencing development corporations, providing environmental evidence and advice and test/showcase best practice.	Thames	Various	Various	Various	Out – The Scheme is not relevant to the implementation of this measure.
Identify Natural Flood Management Opportunities.	Listed in the Thames river basin district FRMP - various local authorities will use a catchment based approach by 2027; to work with communities and landowners to identify nature based solutions including natural flood management. Local authority funding	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

Thames natural flood management.	Thames Regional Flood and Coastal Committee collaborating on £1.3m programme of natural flood management to 2027. Also building on draft plan consultation feedback, explore across Thames scaling up catchment based approach, packaging measures, innovative finance/funding. To achieve more investible propositions, nature based solutions, social and natural capital benefits e.g. natural flood management, SUDs. Building relationships including with CaBA Catchment Partnerships and capacity through collaborative Thames RFCC working groups	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

Rivers and Wetlands Community Day (RWCD) Fund.	The Rivers and Wetlands Community Days fund is provided by Thames Water distributed by a board consisting of the Angling Trust, the Environment Agency, the Institute of Fisheries Management, Thames Water Utilities Limited and the Wild Trout Trust. Projects are engaging and educating local communities, practically involving them in improving rivers and wetlands habitats and water quality. Examples funded include Rivers Weeks, Outfall Safaris in London, natural flood management and creating backwaters. Thirteen projects are being funded 2020/21 at various scales and locations (59 past projects completed) and the partnership is seeking future funding to continue this successful programme contributing to health, wellbeing and green skills.	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Chalk and Ephemeral Stream sustainability actions and flow protection	Policy and voluntary driven abstraction reductions against ground and surface water sustainability assessment standards under CaBA Chalk stream Strategy Actions, Environment Bill sustainability standards and designations. Includes review of licences and flow objective achievement against the naturalised perennial head	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Implementation of the Water Resources Catchment Based Approach (CaBA) Chalk Stream Restoration Group (CSRG) chalk strategy	Policy and voluntary measures to drive abstraction reductions in ground and surface waters in chalk catchments. A local response to climate change and abstraction pressure in these catchments. Policy support is intended to develop to underwrite these.	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure
Water companies work with catchment partners to support flagship chalk stream restoration projects	Habitat restoration measures	Thames	Various	Various	Various	Out - The Scheme does not prevent the implementation of the measure

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