Teddington Direct River Abstraction

Preliminary Environmental Information Report

Appendix 5.3 – Water Framework Directive – Screening

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Appendix 5.3 – Water Framework Directive – Screening

A.1 Executive summary

A.1.1 This preliminary Water Framework Directive (WFD) assessment has been undertaken prior to the preparation of a Water Framework Directive compliance assessment to meet the provisions of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 ('the WFD Regulations') for the Teddington Direct River Abstraction Project (hereafter referred to as 'the Project').

A.1.2 A new abstraction is planned on the freshwater River Thames close to Teddington Weir, allowing for abstractions during low flow conditions to provide additional resilience during drought conditions of up to a 1:200-year drought event.

A.1.3 The Project will entail the following:

a. Abstracted water would be transferred into the Thames Lee Tunnel for conveyance to Thames Water's Lee Valley reservoirs. The operational rate of the intake, when active, is up to 75 megalitres per day (Ml/d). This will most likely operate during low flow periods only to maintain essential water supply during times of water stress.

b. Final effluent from the Mogden Sewage Treatment Works (STW) would be treated to a high standard at a new tertiary treatment plant (TTP) (see Chapter 2: Project Description of the Preliminary Environmental Information Report for processes) proposed within the existing Mogden STW site boundaries.

A.1.4 This report provides an outline of the proposals for the Project and provides a screening/scoping summary of the components/activities forming the Project, the relevant water bodies that the components are either within or adjacent to, and a high-level assessment of likely impacts for construction and operation against relevant quality elements. This is followed by an impact assessment of those activities for each relevant water body and for each relevant quality element. There follows a summary of those activities which will be taken to the next stage of assessment (a detailed compliance assessment).

A.1.5 For the purposes of this assessment, the relevant water bodies include WFD designated groundwater and surface water bodies located in proximity to the Project which could be impacted by the construction and operation phases of the Project.

A.1.6 The following water bodies have been identified to fall within the Zone of Influence (study area for the Project):

a. Thames (Egham to Teddington) (ID: GB106039023232)

b. Thames Upper (ID: GB530603911403)

c. Lockwood Reservoir (ID: GB30641865)

d. Banbury Reservoir (ID: GB30647003)

e. High Maynard Reservoir (ID: GB30641884)

f. Lower Thames Gravels Ground Water Body (ID: GB40603G000300)

A.1.7 The following water bodies are included in the impact assessment:

a. Thames (Egham to Teddington) (ID: GB106039023232)
b. Thames Upper (ID: GB530603911403)
c. Lockwood Reservoir (ID: GB30641865)
d. Lower Thames Gravels Ground Water Body (ID: GB40603G000300)

A.1.8 Given the Project is a drought resilience scheme that comprises infrastructure for the distribution of public water supply, it is assumed that the Project will be operated, within its operational parameters, indefinitely. It is therefore proposed to scope decommissioning out of the assessment. Decommissioning has been scoped out of the assessment as indicated in the Scoping Opinion (Ref 2.2.7 of the Scoping Opinion (Planning Inspectorate (PINS), 2024)). Decommissioning has therefore been scoped out of the Environmental Statement (ES) and the WFD assessment. Substantial maintenance of equipment would be considered as part of the operation and maintenance of the Project and subject to a separate assessment at the time when sufficient details are available.

A.2 Introduction

A.2.1 This report has been produced to provide a preliminary assessment of the Teddington Direct River Abstraction Project (‘the Project’) prior to the preparation of a Water Framework Directive compliance assessment under the requirements of The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (‘the WFD Regulations’).

A.2.2 The WFD Regulations require any new activities (development) to be assessed for their potential impacts against water body status. Any activity which has the potential to have an impact on surface water body status will need consideration in terms of whether it could cause deterioration in the ecological status (natural water bodies (non-heavily modified)) or ecological potential (those which are artificial (AWB) or heavily modified (HMWB)) of the surface water body as well as the chemical status of the surface water body. It is therefore necessary to consider the possible changes to the surface water body and the relevant underlying groundwater body (which is considered in terms of achieving both good groundwater chemical status and quantitative status) associated with the Project.

A.2.3 All surface water bodies are required to achieve ‘good’ ecological status (GES) or ‘good' ecological potential, with the latter applying specifically to HMWB and AWB.

A.2.4 Overall ecological status (or potential) is made up of a number of biological, hydromorphological and chemical quality characteristics called elements. The overall status is determined by the lowest element status.

A.2.5 Any activity which has the potential to have an impact on ecology will need consideration in terms of whether it could cause deterioration in the ecological status or potential of a water body. It is, therefore, necessary to consider the possible changes associated with the proposed options for the Project.

A.2.6 The requirements for groundwater include to prevent deterioration in status and prevent or limit input of pollutants to groundwater. There is also a requirement to achieve good groundwater chemical status and quantitative status.

A.2.7 Regulation 13 of the WFD Regulations 2017 states the objectives for surface water bodies:

a. '*prevent deterioration of the status of each body of surface water;*

b. *protect, enhance and restore each body of surface water (other than an artificial or heavily modified water body) with the aim of achieving GES and (subject to paragraph (3)) good surface water chemical status, if not already achieved, by 22nd December 2021;*

c. *protect and enhance each artificial or heavily modified water body with the aim of achieving good ecological potential and (subject to paragraph (3)) good surface water chemical status, if not already achieved, by 22nd December 2021;*

d. *aim progressively to reduce pollution from priority substances and aim to cease or phase out emissions, discharges and losses of priority hazardous substances.*'

A.2.8 For groundwater bodies, the objectives under Regulation 13 are to:

a. '*prevent deterioration of the status of each body of groundwater;*

b. *prevent or limit the input of pollutants into groundwater;*

c. *protect, enhance and restore each body of groundwater, and ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater chemical status and good groundwater quantitative status, if not already achieved, by 22nd December 2021;*

d. *reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater.*'

A.2.9 To achieve the aims outlined above, a staged approach has been adopted in undertaking the WFD compliance assessment in accordance with the Planning Inspectorate guidance Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (PINS, 2025). The WFD compliance assessment is typically undertaken in three stages:

a. Stage 1. WFD screening: the screening stage should show all relevant WFD water bodies on a map or plan, identify the zone or zones of influence based on specific activities and/or characteristics of the proposed development that could affect the identified water bodies and identify any specific activities and/or characteristics of the proposed development that have been screened out and why.

b. Stage 2. WFD scoping: to identify risks of the proposed development's activities to receptors based on the relevant water bodies and their water quality elements, including information on status, objectives and the parameters for each water body.

c. Stage 3. WFD impact assessment: a detailed assessment of the activities and water bodies carried forward from screening, and the quality elements of the relevant water bodies that are likely to be affected by the proposed development.

A.2.10 Given the Project is a drought-resilience scheme that comprises infrastructure for the distribution of public water supply, it is assumed that the Project will be operated within its operational parameters indefinitely. Decommissioning has been scoped out of the assessment as indicated in the Scoping Opinion (Ref 2.2.7 of the Scoping Opinion (PINS, 2024)).

A.2.11 This report includes Stage 1, Stage 2 and a preliminary impact assessment (which will be used to inform Stage 3). For the purposes of providing a robust WFD compliance assessment at EIA submission stage (DCO application), a preliminary assessment has been produced to help identify Project aspects that can then be addressed. This will be followed by a more detailed assessment at Stage 3. The Stage 3 – WFD Impact Assessment will be submitted with the DCO application.

Teddington Direct River Abstraction

A.2.12 The Project is the preferred option for Thames Water's London Water Recycling Strategic Resource Option. Further information is provided in Chapter 3: Consideration of Alternatives of the Preliminary Environmental Information (PEI) Report.

A.2.13 The Project components for the WFD Regulations assessment, including tunnel, pipelines and shaft locations, and the water bodies under consideration, can be seen in a schematic provided in Plate A.1.

Project overview

A.2.14 The Project is a vital drought resilience scheme that would provide additional water capacity to London during certain conditions. The Project would operate intermittently and would only supply up to the maximum 75Ml/d when required. Modelling scenarios have indicated that the Project would typically operate during low flow periods in the River Thames and on average once in every two years, primarily between the months of August to November.

A.2.15 The Project is explained in PEI Report Chapter 2: Project Description, and a summary is provided here. A Project schematic is also shown on Plate A.1. The Project involves establishing a new abstraction intake on the River Thames approximately 350m upstream of Teddington Weir to be used in a time of drought. The abstracted water would be transferred to Lockwood Pumping Station, part of Thames Water's Lee Valley reservoirs in north-east London via the Thames Lee Tunnel (TLT). The abstracted water would be replaced with recycled water within the River Thames through a discharge from a new outfall

structure 180m upstream of Teddington Weir. The replacement water would be recycled water from a new tertiary treatment plant (TTP) within the existing Mogden Sewage Treatment Works (STW) boundary. The Project comprises the following principal components (also refer to Chapter 2 for additional detail):

a. A new TTP constructed on a platform above some of the existing storm tanks at Mogden STW to process a portion of the final effluent with an output of up to 75Ml/d of recycled water

b. A tunnel boring machine drive shaft and recycled water interception shaft at Mogden STW site

c. A new recycled water conveyance tunnel with an approximate 3.5m internal diameter, between Mogden STW and the Burnell Avenue sites, for the transfer of up to 75Ml/d of recycled water between the TTP and the outfall discharge infrastructure

d. An intermediate shaft at Ham Playing Fields site

e. A recycled water conveyance tunnel reception shaft and connecting conveyance pipe to the outfall structure for the discharge, located on land to the south of Burnell Avenue site

f. A new outfall structure for discharging up to 75Ml/d of recycled water, located either on the bankside or near the bankside in the River Thames upstream of Teddington Weir

g. A new abstraction intake and associated infrastructure, which will take up to 75Ml/d of raw water from the River Thames. This is located on the bankside of the River Thames, approximately 180m upstream of the new outfall structure.

h. A new abstraction connection shaft and raw water conveyance pipeline connecting to the existing TLT. Two options are considered for the TLT connection via a new TLT connection shaft, Burnell Avenue adit and Tudor Drive connection.

Plate A.1 Schematic of the Project

A.2.16 During non-drought periods, the TTP would operate at a maximum flow of 15Ml/d, to maintain biomass within the Moving Bed Biofilm Reactor, with discharge at the current Mogden STW outfall to the tidal River Thames (or Thames Tideway). During these non-drought periods, river water will not be abstracted at the intake and the tunnel sections specific to the Project will be dry.

A.2.17 The intake site is upstream of Teddington Weir (NGR: TQ17287136) and is positioned upstream of the outfall (at a sufficient distance away to prevent potential recirculation).

Structure of the report

A.2.18 The contents of this report are set out in the following structure:

a. Section A.1 – Executive summary

b. Section A.2 – Introduction: Sets out the overview, requirements for WFD and the purpose and structure of this report

c. Section A.3 – Methodology: Outlines the process applied in this report

d. Section A.4 – Stage 1 – WFD Screening: Addresses and identifies relevant WFD water bodies, Zone of Influence (ZoI) and screening aspects for the Project construction and operation activities

e. Section A.5 – Stage 2 – WFD Scoping: Identifies the risks from the Project to receptors

f. Section A.6 – Stage 3(a) – Preliminary Impact Assessment

g. Section A.7 – Conclusion: high level summary of WFD Stages 1, 2 and 3a

Consultation

A.2.19 The Environment Agency is being consulted throughout the Regulators' Alliance for Progressing Infrastructure Development (RAPID) Gated process with respect to the WFD compliance assessment. This has included the preparation of a high-level WFD Compliance Assessment Report in Gate 3 with review by the Environment Agency.

A.2.20 The Applicant has engaged with the Environment Agency from 29 March 2023 to date to discuss associated topics for the WFD including physico-chemical, aquatic ecology and assessment criteria. Engagement will continue as part of Stage 3(b) assessment. For an explanation of Stage 3(b), see paragraph A.3.1.

A.2.21 As outlined in Chapter 2: Project Description, Section 2.9, it is assumed that the need for the Project will be indefinite. As such there are no plans to decommission the Project and the assessment of decommissioning was scoped out of the assessment (Ref 2.2.7 of the Scoping Opinion (PINS, 2024)).

A.2.22 If it is decided that the infrastructure will be decommissioned in the future, this will be subject to further environmental assessment and consents.

A.2.23 For the purposes of the DCO application, consultation with the Environment Agency occurred for the Scoping Report. Further, consultation and engagement will occur with the Environment Agency as the Project progresses through to the next environmental assessment stage.

A.3 Methodology

A.3.1 There are three stages in the WFD assessment process. These include screening and scoping stages followed by an impact assessment. Note there is not a statutory requirement to follow a prescribed methodology as per the legislation but guidance/best practice is usually followed to support the undertaking of the assessment in order to meet WFD objectives.

a. Stage 1 (Screening) identifies the relevant River Basin Management Plan (RBMP) and designated water bodies. It provides an overview of the current baseline in relation to the water environment. Activities and characteristics of the Project in the construction and operational phases and their potential generic impacts are identified, in order to establish the risks from the Project activities to the water bodies and their quality elements. At this stage, activities and characteristics of the Project are either screened in for further assessment or screened out if they do not require further assessment (see Section A.4).

b. Stage 2 (Scoping) identifies the risks from the Project to receptors within the ZoI based on the relevant water bodies and their water quality elements, with a view to later scoping out those activities and water bodies

that do not require assessment (see Section A.5). Note that the scoping of elements for the transitional and coastal water body (TraC) will be based on 'Clearing the Waters for All' guidance (Department for Environment, Food and Rural Affairs (Defra), 2023). The screening, scoping and impact assessment stages are similar to those outlined in the Planning Inspectorate guidance, but the parameters to be assessed differ in that transitional quality elements differ from fresh water. Reservoir quality elements are taken from guidance for lake water bodies as per guidance produced by the UK Technical Advisory Group (UKTAG) on the WFD (2013): Updated Recommendations on Environmental Standards (2015–2021).

c. Stage 3(a) (WFD impact assessment) is a preliminary assessment of water bodies and their quality elements that are considered likely to be affected by the Project as identified in Stage 2.

d. Stage 3(b) (WFD compliance assessment) provides a detailed assessment of activities and quality elements likely to be affected by the proposals for the Project. It outlines those water bodies, elements and activities which have been highlighted in the previous stage as likely having impacts, and those recommended to be further assessed under the requirements of a 'detailed' impact assessment. A further test against the WFD Regulations objectives, and a test for deterioration in water bodies impacted by the Project's proposals will be undertaken.

A.3.2 Mitigation relied upon to demonstrate compliance at any of the stages referred to above must be appropriately defined and sufficiently secured. Mitigation is limited to the embedded mitigation included in the Project's design, such as for the TTP.

A.4 Stage 1 – WFD Screening

A.4.1 The WFD surface water and groundwater bodies within the Project ZoI with respect to the WFD assessment have been identified using Environment Agency Catchment Data Explorer (https://environment.data.gov.uk/catchment-planning).

A.4.2 In accordance with guidance (Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (PINS, 2025)), the WFD water bodies identified have been included based on the extent to which the Project is likely to affect surface and groundwater water bodies up and downstream of, or adjacent to the Project.

A.4.3 WFD screening may determine that no further consideration of WFD quality elements is required, for example, due to the absence of an impact pathway to the receptor or where they fall outside of the ZoI. Where there is uncertainty, this would be ascertained in the preliminary impact assessment.

Relevant RBMPs and water bodies

Surface water bodies

A.4.4 Further to the Project overview provided in Section A.2, the Project is in the Thames Lower Operational Catchment (in the Maidenhead and Sunbury

Management Catchment). The Management Catchment is in the Thames River Basin District, and the Thames RBMP is applicable (Defra, Thames RBMP, last updated October 2022).

A.4.5 The locations of the Project components together with the WFD water bodies in the local area, are shown in Plate A.2. This determines the water bodies within the ZoI.

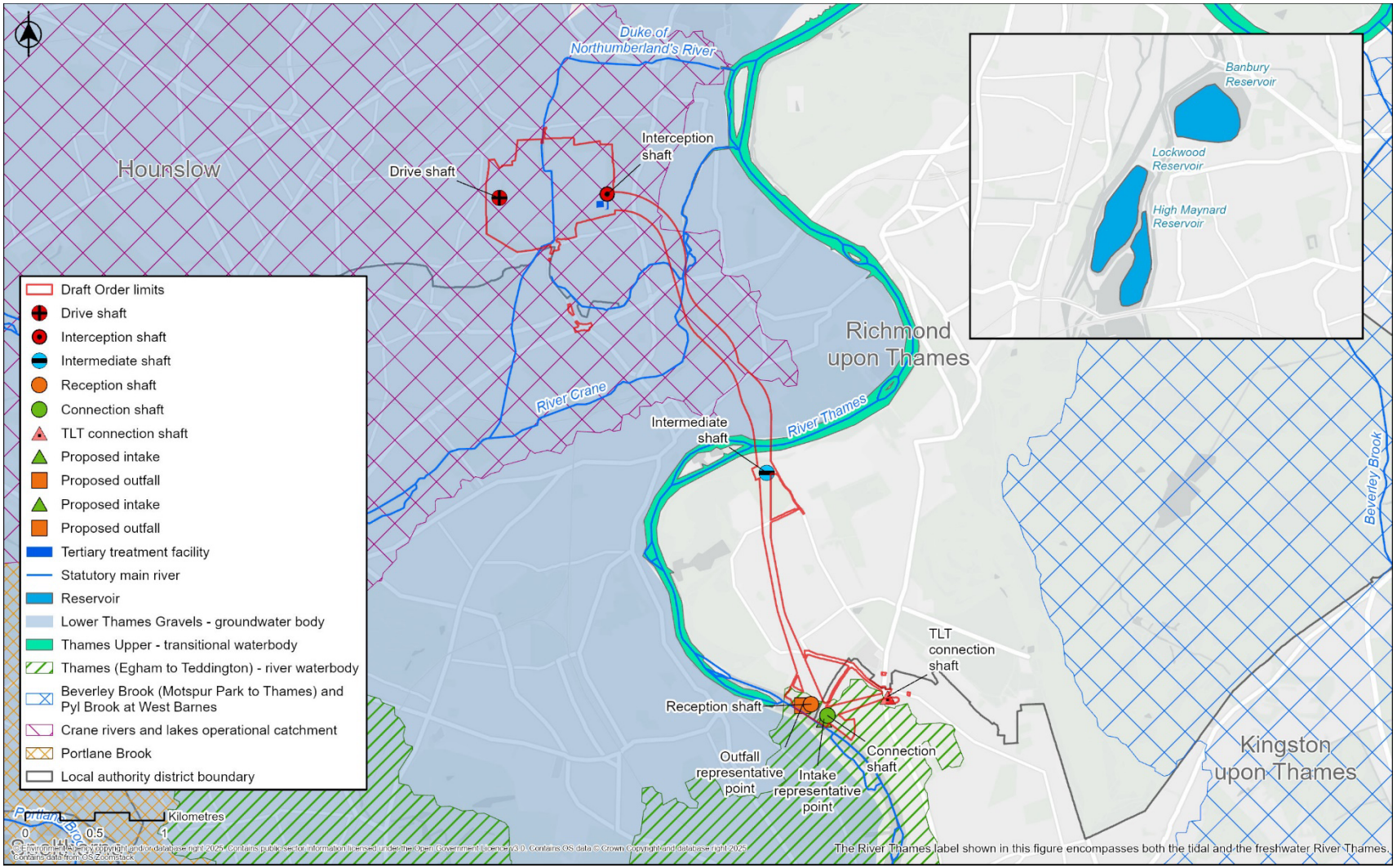
A.4.6 The following water bodies are within the ZoI of the Project:

a. Thames Upper transitional water body (ID: GB530603911403)
b. Thames (Egham to Teddington) river water body (ID: GB106039023232)
c. Lockwood Reservoir (ID: GB30641865)
d. Banbury Reservoir (ID: GB30647003)
e. High Maynard Reservoir (ID: GB30641884)

A.4.7 All these WFD water bodies were considered as part of the screening process, but Banbury Reservoir and High Maynard Reservoir were later scoped out within the impact assessment. Other water bodies outside of the ZoI, but close to it have been discounted due to no hydrological interaction, or likely impact to that relevant water body mainly due to scale of the water body, or distance. The Thames Middle/Lower do not have an interaction with the Project, whereas the Thames Upper TraC does.

A.4.8 Furthermore, as there will be no change to Coppermills Water Treatment Works operation the Lower Maynard (which receives screen wash water) is not included. Also, as there will be no change beyond High Maynard Reservoir, Banbury Reservoir and Walthamstow Reservoir are also not included on this basis. There will be no change in flows in Coppermill Stream downstream of the Coppermills intake, resulting in the Lee water body being excluded. There is no Project interaction with the Crane and Duke of Northumberland's River so these are scoped out.

Plate A.2 Project draft Order limits and WFD relevant water bodies

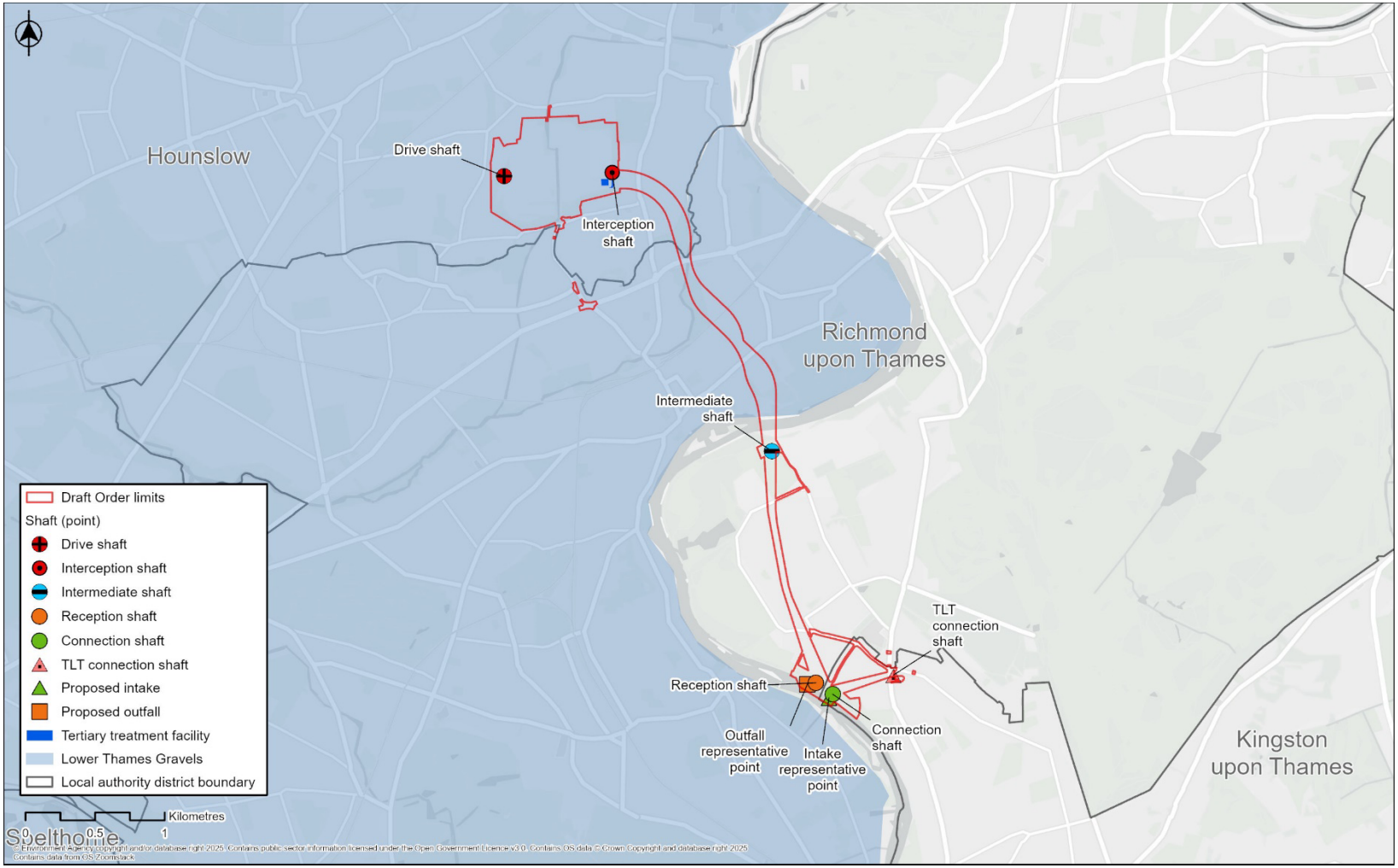


Groundwater body

A.4.9 The Mogden STW site and northern half of the conveyance route are located in the Lower Thames Gravels Water Body (ID: GB40603G000300) catchment area (Plate A.3). This groundwater body is in the Colne Groundwater Operational Catchment (in the Thames Groundwater Management Catchment) which is in the Thames River Basin District, and the Thames RBMP is applicable. This water body is also classified as a Drinking Water Protected Area.

A.4.10 The southern half of the conveyance route and the sites at Ham Playing Fields, Burnell Avenue and Tudor Drive are not located within the catchment of a groundwater body. In these locations, the thickness of London Clay between the surface and the underlying Chalk bedrock acts as a barrier between the aquifer at depth and the surface water.

Plate A.3 Project draft Order limits and WFD groundwater body



Project ZoI

Construction and commissioning (operation) activities

A.4.11 All proposed construction activities and commissioning activities which have potential pathways resulting in effects to water bodies, either through construction activities or drainage pathways, are listed in Table A.4. Aspects of the Project's proposals are included below, including potential pathways of effect and the relevant water body

A.4.12 For context, aspects are the Project components at high resolution. Within these components there are specific activities which will be picked up in detail in Stage 3 as the activities occur. Once full design information is known, these will become the formal activities which will be assessed for WFD compliance.

Project operation effects

A.4.13 For Project effects during operation, the ZoI is given at a water body scale (Table A.2). It is based on aspects of the Project's operation that could affect the identified water bodies. This includes the extent to which potential changes to water flows and water quality are likely.

Baseline characteristics of water bodies

A.4.14 This section establishes the baseline characteristics for each water body identified above using Catchment Data Explorer cycle 3 RBMP data (Table A.1, Table A.2 and Table A.3). It describes the current classification status for all elements for each identified water body and indicates reasons for not achieving good status and reasons for deterioration (refer to Annex A).

Table A.1 WFD elements for surface water (all Cycle 3 data; EA, 2022) (also refer to Annex A)

Designated water body name	Thames (Egham to Teddington)	Thames Upper
Water body ID	GB106039023232	GB530603911403
Water body type	River	Transitional
NGR	TQ0505668161	TQ2148876502
Hydromorphological designation	HMWB	HMWB
Length (km)	31.5	-
Catchment area/ surface area (km^2)	44.82 (catchment area)	3.34 (surface area)
Status objective	The objective of achieving Good ecological status is defined as not technically feasible in 2015, and the objective of Good chemical status is 2063.	The objective for achieving Good ecological status is 2027 with low confidence, and the objective of Good chemical status is 2063.
Reasons for not achieving good	Diffuse and point-source pressures from transport drainage, poor nutrient management, and sewage discharge. In addition, physical modifications impact this water body, including low flow. The determining elements for not achieving Good status are macrophytes and phytobenthos (combined) among biological quality elements; phosphate among physico-chemical quality elements; perfluorooctane sulphonate (PFOS); and PBDE. Mitigation measure assessment (supporting element) is also listed.	The reason for not achieving Good status is that diffuse and point source pressures from sources of urban development, contaminated sediment, landfill leaching, sewage discharge, and the use of restricted substances (tributyltin compounds) have impacted the water body. In addition, physical modifications and surface water abstraction are among the pressures seen in this water body. The sources of the chemicals listed below are also unknown and are under investigation: • Benzo(g-h-i)perylene • Benzo(k)fluoranthene • Cypermethrin (Priority) • Zinc

Designated water body name	Thames (Egham to Teddington)	Thames Upper
		• Benzo(b)fluoranthene The indicated reason for deterioration is phytoplankton status deterioration from High to Good status. However, no action is required.
Biological elements	Invertebrates are High, macrophytes, and phytobenthos combined are Poor.	Biological quality elements (fish, phytoplankton) are classified as Good.
Hydromorphological	Not Assessed	Hydromorphological supporting elements were classified as Supports Good. Hydrological Regime does not support Good
Physico-chemical	Moderate	Good
	Due to the moderate status classification of phosphate and temperature. BOD and dissolved oxygen are Good. Acid neutralising capacity and ammonia are High	Dissolved oxygen – Good
Specific pollutants	High	Specific pollutants and supporting elements show Moderate status, noting that only Zinc is Moderate (others are High).
Chemical	Does not require assessment	Does not require assessment
Protected areas	• Lower Thames (Cookham Egham Teddington) SWSGZ4016 Safeguard Zone (Drinking Water) • South West London Waterbodies UK9012171 Special Protection Area • South West London Waterbodies UK11065 Ramsar site • River Thames UKENRI17 Urban Waste Water Treatment Directive	The River Wandle (ID: UKENRI157) was identified as a Nutrient Sensitive Area. The reason for sensitive area designation is eutrophication in rivers.

Table A.2 WFD elements for reservoir (2019 and 2022, EA 2022) (also refer to Annex A)

Designated water body name	Lockwood Reservoir (2022)
Water body ID	ID: GB30641865
Water body type	Lake
NGR	TQ3527390265
Hydromorphological designation	Artificial
Surface area (ha)	26.616
Current overall status	Moderate
Status objective	N/A
Reasons for not achieving good	Total phosphorus concentration originating from sewage discharge. PFOS was assessed as Fail, and the originating source is under investigation. In addition, physical modification is among the pressures seen in this water body. The objective of achieving Good ecological status is not defined due to disproportionately expensive mitigation measures, and the objective of Good chemical status is 2063.
Biological elements	High
Hydromorphological	N/A
Physico-chemical	Moderate; salinity is High; Total nitrogen and total phosphorous are Bad
Specific pollutants	Copper – High
Chemical	Does not require assessment
Protected areas	Drinking water protected area, Lee Nitrate Vulnerable Zone S443 Nitrate Vulnerable Zone (Nitrates Directive) Lee Valley UK9012111 Special Protection Area Lee Valley UK11034 Ramsar Lee swsgz4006 safeguard zone.

Table A.3 WFD elements for groundwater body (EA, 2022)

Designated water body name	Lower Thames Gravels Water Body
Water body ID	GB40603G000300
Water body type	Groundwater Body
NGR	TQ0543576430
Hydromorphological designation	N/A
Catchment area (km^2)	269.87
Status objective	N/A
Reasons for not achieving good	Diffuse and point-source pressures from sewage discharge.
Biological elements	Not assessed
Hydromorphological	Not assessed
Physico-chemical	Not assessed
Specific pollutants	Not assessed
Chemical	Chemical Status – Good (2015)
Protected areas	South West London Waterbodies UK9012171 Special Protection Area South West London Waterbodies UK11065 Ramsar Site Roundmoor Ditch and Boveney Ditch NVZ S466 Nitrates Directive Lower Thames Gravels UKGB40603G000300 Drinking Water Protected Area

WFD screening aspects

A.4.15 WFD screening aspects have been reviewed in two groups, namely construction and commissioning activities and Project operation, as per professional experience and against supporting information in other chapters. This includes all aspects of the Project which are deemed to require assessment under the WFD Regulations. As stated in paragraph A.2.10 it is assumed that the Project will be operated within its operational parameters indefinitely and decommissioning is not included in the assessment.

Construction and commissioning activities

A.4.16 The characteristics of the Project and the relevant components of the construction programme and the range of activities have been screened to determine the extent to which the Project is likely to affect the WFD objectives of the water bodies listed above, as per the WFD screening guidance (Nationally Significant Infrastructure Projects: Advice on the Water Framework Directive (PINS, 2025)).

A.5 Stage 2 – WFD Scoping

Identify the risks to the receptors

A.5.1 This section provides an initial assessment to identify the potential risks from the Project to receptors within the ZoI, based on the relevant water bodies and their water quality elements, as well as identify those water bodies where a more detailed impact assessment is required. Reference has been made to material in:

a. PEI Report Chapter 5: Water Resources and Flood Risk
b. Appendix 5.1: Surface Water and Water Quality Baseline Information
c. Chapter 6: Aquatic Ecology
d. Appendix 6.1: Aquatic Ecology Baseline and Supporting Information
e. Appendix 6.2: Additional Environmental Data to Support Aquatic Ecology Assessment
f. Appendix 7.1: Habitats Regulations Assessment (HRA) – Stage 1 Screening

A.5.2 The following table (Table A.4) includes those elements that are likely to be scoped in and covered in further detail in Stage 3. Impact assessment follows on from Table A.4.

A.5.3 Invasive non-native species (INNS) are scoped in based on professional judgement and inclusion in other compliance assessments. ‘Clearing the Waters for All’ guidance (Defra, 2023) also recommends inclusion; therefore the decision has been made to include for all water bodies.

A.5.4 Protected areas are also scoped in due to the need to include them as part of testing against wider environmental objectives as part of compliance in the next stage of WFD assessment (Stage 3(b)).

Table A.4 Quality elements scoped in for Stage 3a WFD Assessment

Water body type	Quality element	Scoped in (✓)/out (×) elements for each activity							
		TTP, drive and interception shafts, embankment cut back and installation of retaining wall	Recycled water conveyance tunnel	Reception and connection shafts	Pipeline	Intake structure	Outfall structure (bankside and near bankside in-river options)	Intermediate shaft	Water discharge into Lockwood Reservoir
Freshwater water bodies	Biological – Fish	×	✓	✓	✓	✓	✓	✓	×
	Biological – Invertebrates	×	✓	✓	✓	✓	✓	✓	×
	Biological – Macrophytes and phytobenthos	×	✓	✓	✓	✓	✓	✓	×
	Hydromorphological – Connection to groundwater	×	✓	×	✓	✓	✓	✓	×
	Hydromorphological – Quantity and dynamics of flow	×	✓	✓	✓	✓	✓	✓	×
	Hydromorphological – River depth and width variation	×	×	✓	✓	✓	✓	✓	×
	Hydromorphological – Structure and substrate of the riverbed	×	✓	✓	✓	✓	✓	✓	×

Water body type	Quality element	Scoped in (✓)/out (×) elements for each activity							
		TTP, drive and interception shafts, embankment cut back and installation of retaining wall	Recycled water conveyance tunnel	Reception and connection shafts	Pipeline	Intake structure	Outfall structure (bankside and near bankside in-river options)	Intermediate shaft	Water discharge into Lockwood Reservoir
	Hydromorphological – Structure of the riparian zone	×	✓	✓	✓	✓	✓	✓	×
	Physico-chemical – Thermal conditions	×	✓	×	✓	×	×	✓	×
	Physico-chemical – Oxygenation conditions	×	×	×	×	✓	✓	✓	×
	Physico-chemical – Salinity	×	×	×	×	×	×	✓	×
	Physico-chemical – Acidification status	×	×	×	×	×	×	✓	×
	Physico-chemical – Nutrient conditions	×	×	×	×	✓	×	✓	×
TraC	Hydromorphological	✓	×	✓	×	×	×	✓	×
	Biological – habitats	✓	✓	✓	✓	✓	✓	✓	×
	Biological – fish	✓	✓	✓	✓	✓	✓	✓	×
	Physico-chemical – Water quality	✓	×	✓	×	×	×	✓	×

Water body type	Quality element	Scoped in (✓)/out (×) elements for each activity							
		TTP, drive and interception shafts, embankment cut back and installation of retaining wall	Recycled water conveyance tunnel	Reception and connection shafts	Pipeline	Intake structure	Outfall structure (bankside and near bankside in-river options)	Intermediate shaft	Water discharge into Lockwood Reservoir
Reservoir – lake water body	Biological – Fish	×	×	×	×	×	×	×	×
	Biological – Invertebrates	×	×	×	×	×	×	×	×
	Biological – Phytoplankton	×	×	×	×	×	×	×	×
	Biological – Other flora (macrophytes etc)	×	×	×	×	×	×	×	×
	Hydromorphological – Quantity and dynamics of flow	×	×	×	×	×	×	×	✓
	Hydromorphological – Residence time	×	×	×	×	×	×	×	×
	Hydromorphological – Connection to groundwater	×	×	×	×	×	×	×	×
	Hydromorphological – Depth	×	×	×	×	×	×	×	×
	Hydromorphological – Substrate	×	×	×	×	×	×	×	×
	Hydromorphological – Shoreline structure	×	×	×	×	×	×	×	×
	Physico-chemical – Thermal conditions	×	×	×	×	×	×	×	✓

Water body type	Quality element	Scoped in (✓)/out (×) elements for each activity							
		TTP, drive and interception shafts, embankment cut back and installation of retaining wall	Recycled water conveyance tunnel	Reception and connection shafts	Pipeline	Intake structure	Outfall structure (bankside and near bankside in-river options)	Intermediate shaft	Water discharge into Lockwood Reservoir
	Physico-chemical – Oxygenation conditions	×	×	×	×	×	×	×	✓
	Physico-chemical – Salinity	×	×	×	×	×	×	×	✓
	Physico-chemical – Acidification status	×	×	×	×	×	×	×	✓
	Physico-chemical – Nutrient conditions	×	×	×	×	×	×	×	✓
	Physico-chemical – Transparency	×	×	×	×	×	×	×	✓
	Specific Pollutants	×	×	×	×	×	×	×	×
Groundwater	Quantitative – Saline intrusion	×	×	×	×	×	×	×	×
	Quantitative – Water balance	✓	✓	✓	✓	✓	✓	✓	✓
	Quantitative – Groundwater Dependent Terrestrial Ecosystem (GWDTE)	×	×	×	×	×	×	×	×

Water body type	Quality element	Scoped in (✓)/out (×) elements for each activity							
		TTP, drive and interception shafts, embankment cut back and installation of retaining wall	Recycled water conveyance tunnel	Reception and connection shafts	Pipeline	Intake structure	Outfall structure (bankside and near bankside in-river options)	Intermediate shaft	Water discharge into Lockwood Reservoir
	Quantitative – Dependent surface WFD water body status	✓	✓	✓	✓	✓	✓	✓	×
	Chemical – Drinking water protected area	✓	✓	✓	✓	✓	✓	✓	×
	Chemical – General chemical test	✓	✓	✓	✓	✓	✓	✓	×
	Chemical – GWDTE	×	×	×	×	×	×	×	×
	Chemical – Saline intrusion	×	×	×	×	×	×	×	×
	Chemical – Dependent surface WFD water body status	×	×	×	×	×	×	×	×
All water bodies	Protected Areas	✓	✓	✓	✓	✓	✓	✓	✓
	INNS	✓	✓	✓	✓	✓	✓	✓	✓

A.5.5 With regard to scoping, those quality elements scoped in against an activity are because there is a pathway. The impact assessment for each scoped in activity, quality element versus water body is explained in Stage 3a (preliminary impact assessment). The reasons for scoping out are because there is no pathway to cause an impact. Scoping out was informed by professional judgment combined with review between other PEI Report aspect chapters (5–19).

A.5.6 The scoping has been undertaken with cognisance of information/data reviewed in PEI Report Chapter 5: Water Resources and Flood Risk; Appendix 5.1: Surface Water and Water Quality Baseline Information; Chapter 6: Aquatic Ecology; Appendix 6.1: Aquatic Ecology Baseline and Supporting Information; Appendix 6.2: Additional Environmental Data to Support Aquatic Ecology Assessment; and Appendix 7.1: HRA – Stage 1 Screening.

A.5.7 The below is a summary of the scoped-in elements to be taken forward into Stage 3a (preliminary assessment). There is an assumption that activities are scoped in for construction and operation. The scoped-in elements are listed in Table A.5.

Table A.5 Scoped-in quality elements

Watercourse	Scoped-in elements
Freshwater water bodies	Biological: fish, invertebrates, macrophytes and phytobenthos Hydromorphological: connection to groundwater, quantity and dynamics of flow, river depth and width variation, structure and substrate of the riverbed and structure of the riparian zone Physico-chemical: thermal conditions, oxygenation conditions, salinity, acidification status and nutrient conditions
Transitional water bodies	Hydromorphological Biological: habitats and fish Physico-chemical: water quality
Reservoir water bodies	Hydromorphological: quantity and dynamics of flow Physico-chemical: thermal conditions, oxygenation conditions, salinity, acidification status, nutrient conditions and transparency
Groundwater water bodies	Quantitative: water balance and dependent surface WFD water body status Chemical: drinking water protected area and General chemical test
All surface water bodies	Protected areas and INNS

Protected areas

A.5.8 Protected areas located in the water body catchments within the ZoI area are identified within Tables A.1, A.2 and A.3 (and also refer to Annex A) and are scoped in to further assessment.

A.5.9 It has been assessed whether WFD protected areas are at risk from the Project's operational activities.

A.5.10 The types of WFD protected areas include:

a. Areas designated for the abstraction of water for human consumption (Drinking Water Protected Areas)

b. Areas designated for the protection of economically significant aquatic species (Freshwater Fish and Shellfish)

c. Bodies of water designated as recreational waters, including areas designated as Bathing Waters

d. Nutrient-sensitive areas, including areas identified as Nitrate Vulnerable Zones under the Nitrates Directive or areas designated as sensitive under The Urban Wastewater Treatment (England and Wales) Regulations 1994

e. Areas designated for the protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection, including relevant Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites.

A.5.11 Reference has also been made to the accompanying Appendix 7.1: HRA – Stage 1 Screening.

A.6 Stage 3(a) – Preliminary Impact Assessment

Mogden STW site

Table A.6 WFD Preliminary Impact Assessment – TTP, drive and interception shafts, embankment cut back and installation of retaining wall

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Quantitative – Water balance	Lower Thames Gravels (GB40603G000300)	Construction	The groundwater control required at the Western and Eastern Work Areas may have a temporary and localised effect on groundwater. Any dewatering will potentially affect the quantitative water balance of the water body, but due to the anticipated small scale and short-term duration of the dewatering, this is only considered as a minor effect on the water balance element of the quantitative status of the groundwater body. This will not create a negative impact at the scale of the water body.	Groundwater control measures will be designed in such a way as to minimise the volume of water required to be abstracted and the timescale of the dewatering activities, thus limiting the impact on the water balance.
Quantitative – Dependent surface WFD water body status	Lower Thames Gravels (GB40603G000300)	Construction	The groundwater control required at the Western and Eastern Work Areas may have a temporary and localised effect on groundwater. Any dewatering could potentially affect any connected surface water bodies that are present within the radius of influence around the dewatering locations. Risk is uncertain at this point and it will be	N/A

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			ascertained at Stage 3(b) of the assessment once the Hydrogeological Impact Assessment is complete.	
Groundwater Chemical – Drinking water protected area	Lower Thames Gravels (GB40603G000300)	Construction	The works proposed at the Western and Eastern Work Areas are not anticipated to encounter significant contaminated land or poor-quality water or create new or different pathways for existing poor-quality water to migrate to aquifers that support drinking water supplies. If any such land or water is encountered, it would be remediated as per the recommendations set out in Chapter 10: Ground Conditions and Contaminated Land, of the PEI Report. As such, the works are considered to pose a negligible effect on the drinking water protected area element of the chemical status of the groundwater body.	Remediation of any poor-quality groundwater encountered on site.
Groundwater Chemical – General chemical test	Lower Thames Gravels (GB40603G000300)	Construction	The works proposed at the Western and Eastern Work Areas are not anticipated to encounter significant contaminated land or poor-quality water or create new or different pathways for existing poor-quality water to migrate through the aquifer. If any such land or water is encountered, it would be remediated as per the recommendations set out in Chapter 10: Ground Conditions and Contaminated Land, of the PEI Report. As such, the works are considered to pose a negligible effect on the general chemical test	Remediation of any poor-quality groundwater encountered on site.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			element of the chemical status of the groundwater body.	
Biological: Fish	Thames Upper (GB530603911403)	Operation	The STW would reduce final effluent from Mogden STW discharged to the tidal River Thames with potential effects on aquatic ecology due to changes in water quality by 75Ml/d at times of drought (only). The fish community composition is predominantly a mixture of coarse and estuarine fish. Water quality changes would benefit fish as the operation of the Project is likely to temporarily improve the water quality directly downstream of the existing Mogden STW discharge. There is likely to be a reduction in nutrients such as phosphate and nitrate. At low tide there may be minor changes in sediment exposure on the 'shore' as well as increased sediment plumes within the water column as a result of reduced discharge from the outfall. The combined impacts from changes in water quality and tidal inundation due to the operation of Mogden STW are not likely to negatively affect fish.	N/A
Biological: Habitats	Thames Upper (GB530603911403)	Operation	At low tide there may be minor changes in sediment exposure on the 'shore' as well as increased sediment plumes within the water column as a result of reduced discharge from	N/A

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			the outfall. This may have localised effects on habitat along the margins of the water body but this will be negligible and localised due to the scale of the water body. Any change may result in species distribution and/or habitat composition. This is unlikely due to the nature of change, the scale of the water body caused by the activity, as well as the frequency and duration of change due to the operation of the Project only during drought conditions.	
Hydromorphological	Thames Upper (GB530603911403)	Operation	At low tide there may be minor changes in sediment exposure on the 'shore' as well as a risk of sediment plumes within the water column as a result of discharge from the outfall. Any change will be localised and minor due to the nature of change, the rate of change and the scale of the water body, as well as the frequency and duration of change due to the operation of the Project only during drought conditions. It will also depend on how these changes relate to tidal inundation and the state of the tidal window at the time of operation.	N/A
Physico-chemical – Water quality	Thames Upper (GB530603911403)	Operation	The TTP would result in a reduction in the overall nutrient load discharged to the estuary. The level of benefit will be determined from interpretation of hydrodynamic modelling (refer to PEI Report Chapters 5 and 6). Mostly, there will be reduced discharges from Mogden STW	N/A

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			during low flows which would remove any temperature increases from the discharge and reduce the volume of freshwater entering the tideway. There will be reduced nutrients such as phosphate and nitrate, along with dissolved oxygen and salinity. Suspended sediments and dissolved inorganic nitrogen are predicted to reduce as a result of the discharge also.	
Groundwater Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area Chemical – General chemical test	Lower Thames Gravels (GB40603G000300)	Operation	No impacts to groundwater are anticipated during the operation phase of the Project as there would be no pathway between the Project structures (as they are impermeable) and any groundwater receptors.	N/A

Ham Playing Fields site

Table A.7 WFD Preliminary Impact Assessment – Intermediate shaft

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Hydromorphological	Thames Upper (GB530603911403)	Construction	The Main Work Area of Ham Playing Fields site is approximately 250m from the water body with no direct hydraulic connectivity with the river, whereas the Support Work Area by Ham Street Car Park is immediately adjacent to the tidal River Thames. Overland flow pathways remain but would be of medium duration from source to receptor. Runoff generated contaminant mobilisation from open ground or spoil or fuel leaks, and transfer is a viable risk, but would require transfer of considerable volumes of water to reach the water body. This is likely to be a negligible impact. If this were to occur overall construction related release is predicted to be small relative to the baseline sediment load already in the Upper Thames. The construction of the temporary dewatering pipe may impact the riparian zone, channel banks and potentially the channel bed. The pipe would be removed after construction. Impacts would be negligible and temporary.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft Code of Construction Practice (CoCP). All pollution to be controlled under current best practice.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Biological – Fish	Thames Upper (GB530603911403)	Construction	Diadromous fish and non-diadromous freshwater and estuarine fish communities are at risk of pollution, degrading water quality and disturbance through noise, vibration and lighting during construction activities as set out in the Aquatic Ecology chapter (Chapter 6). Some species will be more sensitive than others. This is likely to be for the duration of works and could create a negative impact. This will be assessed further in Stage 3(b).	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Measures will be taken to prevent excess sediment spillage or disturbance into the watercourse.
Biological – Habitats	Thames Upper (GB530603911403)	Construction	Construction of the Ham Playing Fields site has the potential to impact the ecology of the Thames Upper through temporary impacts on surface water quality, pollution, sediment release and loss of habitat. The potential in-river works are not expected to lead to permanent loss of macroinvertebrate species but may	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			involve temporary disturbance to the riparian zone, channel banks and potentially the channel bed in the immediate vicinity of the temporary contingency dewatering pipe. The effects of this disturbance on habitats will be assessed fully in the ES and in a detailed impact assessment (Stage 3(b)) when further details of the proposed construction have been developed. However, any direct habitat loss is expected to be minimal, and macroinvertebrate communities are expected to recolonise the area rapidly following the cessation of construction works. The release of sediment associated with any in-river works could potentially result in a spike in available nutrients, which has the potential to affect phytoplankton communities, encourage growth, and potentially cause the occurrence of algal blooms. It is likely that the level of suspended sediment generated would be within the natural fluctuations of suspended sediment within the water body. High flows would flush sediment, so impacts are predicted to be temporary, with	quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			phytoplankton communities able to return to baseline conditions rapidly.	
Physico-chemical – Water quality	Thames Upper (GB530603911403)	Construction	Changes in sediment transport, as well as potential release of sediments/contaminants as a result of construction may cause a localised change in water quality within the water body. Any changes in water quality will be minimal against background conditions and likely be in the form of localised plumes.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area Chemical – General chemical test	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *250m north of site*	Construction	The intermediate shaft of the conveyance tunnel will be constructed through the overlying superficial deposits to the London Clay. At this site, the superficial deposits are not considered to be part of a recognised WFD groundwater body.	Hydrogeological Impact Assessment to confirm assumptions of radius of influence of dewatering and subsequent effects on groundwater body.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			Some groundwater control measures are anticipated to be required to be undertaken at the site. However, any impacts of these measures are expected to be temporary in duration and localised to the area around the site, not spreading to the Lower Thames Gravels groundwater body to the north of the site. This will be confirmed through the Hydrogeological Impact Assessment that will be undertaken and reported in the ES.	Implementation of standard good practice and by adhering to the draft CoCP as well as the development of the construction methodology would help to reduce the impact of dewatering.
Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area Chemical – General chemical test	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *250m north of site*	Operation	No impacts to groundwater are anticipated during the operation phase of the Project as there would be no pathway between the Project structures (as they are impermeable) and any Groundwater receptors.	N/A

Recycled water conveyance tunnel and Burnell Avenue site

Table A.8 WFD Preliminary Impact Assessment – Recycled water conveyance tunnel and pipeline (construction phase only[1])

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area Chemical – General chemical test	Lower Thames Gravels (GB40603G000300)	The conveyance tunnel and pipeline will be constructed through the London Clay, a low permeability horizon classified as unproductive strata that lies between the upper superficial aquifers of the Lower Thames Gravels and the lower bedrock aquifer of the Chalk. With the exception of the shaft at the northern end of the tunnel (considered as part of the works at Mogden STW), the tunnel will not affect the Lower Thames Gravels water body and so will have a negligible effect on the quantitative and chemical statuses of the groundwater body.	N/A
Biological – Fish	Thames (Egham to Teddington) (GB106039023232)	During construction, the outfall and intake would cause effects on the local fish species. These effects will mainly be due to noise and vibration while works are being completed. Due to the temporary nature and localised impact of these works coupled with the general distance from the main watercourse that these works are taking place, the effects are thought to be negligible.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

[1] For operation phase, refer to Table A.13

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Biological – Invertebrates, macrophytes and phytobenthos	Thames (Egham to Teddington) (GB106039023232)	During the construction phase, invertebrates could be affected by accidental discharge of fine silt and contaminants that could impact macrophytes and phytobenthos also. Changes in sediment loading promote plumes and fines deposition. This may cause displacement and/or loss of species. This would negatively impact the water body. Although these risks are present, it is considered that due to the works being completed mainly away from the channel and the works being temporary and localised, any effects here will prove as negligible on a water body scale.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – Connection to groundwater	Thames (Egham to Teddington) (GB106039023232)	No changes are anticipated on the connectivity between surface and groundwater bodies.	N/A
Hydromorphological – Quantity and dynamics of flow	Thames (Egham to Teddington) (GB106039023232)	During construction there is the possibility of flow changes within the channel, which could lead to disruption to species within the channel and substrate changes locally, mainly due to sediment transport. Though these changes are possible, most of the works will be completed away from the channel so these risks are not thought to be of concern from a WFD compliance perspective.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – Structure and	Thames (Egham to Teddington) (GB106039023232)	When constructing the new tunnel much of the works will be completed offline, with the majority of the impact occurring when	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
substrate of the riverbed		realignments are made to the watercourse. Excavations for the outfall could cause localised eddying, bed and bank disruption. Excavations could also cause localised scouring of the bed and banks. Though due to the temporary and localised nature of these on a water body scale, these consequences would be minimal.	enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological: Structure of the riparian zone	Thames (Egham to Teddington) (GB106039023232)	Riparian vegetation clearance may be required for the point where the new tunnel intersects with the channel at the outfall. In the absence of mitigation, clearing and compacting soils in a riparian corridor can have long-term, localised effects on plant type, abundance, and re-establishment. Excavating in these areas would have an influence on local riparian characteristics, including the floodplain. Although there may be noticeable effects on water quality, based on water body scale, locality and size of footprint of works, they are not considered large enough to cause a concern.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Physico-chemical – Thermal conditions	Thames (Egham to Teddington) (GB106039023232)	Through construction of the outfall there is potential for sediment to be redistributed which could cause physico-chemical risks such as a change in pH, decreased water clarity, increased turbidity, etc. There may be minimal sediment and contaminants to enter the watercourse, most of the risk is from the outfall. Furthermore, fine sediment levels	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Appropriate measures will be in place to limit dispersal of fines and contaminants.

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
		would be dispersed downstream from building zones, with little effect on pH levels.	Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Biological – Fish	Thames Upper (GB530603911403)	During construction, the outfall and intake would cause effects on the local fish species. These effects will mainly be due to noise and vibration while works are being completed. Due to the temporary nature and localised impact of these works coupled with the general distance from the main watercourse that these works are taking place, the effects are considered to be negligible.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Biological – Habitats	Thames Upper (GB530603911403)	There may be a likely change in habitat due to construction of the outfall as a result of loss/change of footprint and changes in species type, number and quality, and/or sediment redistribution. This will be a localised change (if at all). There will be no impact to water body status.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

Table A.9 WFD Preliminary Impact Assessment – Reception and connection shafts

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Biological – Fish	Thames (Egham to Teddington) (GB106039023232)	Construction	Outfall construction at the Burnell Avenue site would require a cofferdam. Installation and the draining of the area to allow for construction would lead to a temporary loss of aquatic habitat for 18 months (approximately). The introduction of a cofferdam could cause disruption (through noise or vibration) to migratory processes and possible injury or fatality to fish – either due to changing water levels or because of any pollution from within the cofferdam with the works ongoing. Construction of the outfall and intake would require excavation of the riverbed and bankside. This would lead to the permanent loss of a short section of river, marginal and bankside habitat where the structures would be installed. Temporary loss of wetted habitat would likely cause a minor displacement of fish species within the cofferdam area. However, once removed, fish would likely recolonise the area. It is not likely that the temporary loss of habitat would cause the disappearance of certain species inhabiting this area of the River	Once the cofferdam is installed, prior to dewatering and pumping out of the works area, a fish rescue would take place as outlined in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology, by a suitably trained ecologist to safeguard fish populations. All fish captured within the cofferdam area would be returned to the main River Thames. Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			Thames; therefore, impacts as a result of habitat loss for fish during the construction phase are negative but insufficient to impact water body status. During both near bankside in-river and bankside construction, there is a risk sediment may be mobilised in the river channel, which could have an adverse effect on fish. Noise and vibration caused by barges and pile driving activities during the construction of the cofferdam within the water body have the potential to impact fish through disturbance and, in extreme cases (if there were no avoidance by the fish), may result in mortality. The introduction of construction-phase barges is unlikely to significantly impact fish along the river.	After the construction has been completed, the area would be reinstated as riverine habitat.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Biological – invertebrates, macrophytes and phytobenthos	Thames (Egham to Teddington) (GB106039023232)	Construction	Local populations of invertebrates and macrophytes will be affected by the cofferdam's introduction. There is potential that when the cofferdam is being set up, sediment could enter the channel and lead to loss of habitat and/or species smothering. Temporary loss of wetted habitat would likely cause a minor displacement of species also. This area would recolonise once this has been removed however.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – Quantity and dynamics of flow	Thames (Egham to Teddington) (GB106039023232)	Construction	Changes to the flow are expected while the cofferdam is being constructed. These changes are expected to be temporary and localised and only impact the area local to the cofferdam and not affect the overall river flow or discharge.	N/A
Hydromorphological – River depth and width variation	Thames (Egham to Teddington) (GB106039023232)	Construction	There would be local change to river depth and width and temporary loss of marginal areas whilst the cofferdam is in place. This is a small area compared to the size of the water body and unlikely to impact on water body status.	N/A

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Hydromorphological – Structure and substrate of the riverbed	Thames (Egham to Teddington) (GB106039023232)	Construction	Potential change to structure of substrate during construction of the cofferdam and some potential local aggregation of silts is likely during the period of cofferdam placement. There may be a temporary change to river bed levels in the main channel as a result of temporary cofferdam but this will result in a temporary and localised effect. This change depends on timing of works, and whether there will need to be deep excavations.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological: Structure of the riparian zone	Thames (Egham to Teddington) (GB106039023232)	Construction	There is unlikely to be a substantial change to the riparian zone – the change will be limited to areas of bankside working. This depends on site set up. Any change would be for a small footprint and likely be reinstated once works are complete.	N/A
Hydromorphological	Thames Upper (GB530603911403)	Construction	There could be small-scale, localised changes to the substrate and bed morphology as a result of construction. These changes will occur for the duration of the works. There is unlikely to be a substantial change in shoreline, sediment transport pathways or	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			hydrodynamics during this time, and no greater than background conditions.	quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Biological – Fish	Thames Upper (GB530603911403)	Construction	Installation and the draining of the area to allow for construction would lead to a temporary loss of aquatic habitat. There may be disruption to migration and possible injury or fatality to fish – either due to changing water levels or because of any pollution from within the cofferdam with the works ongoing, or because of the barge and pile driving activities. Temporary loss of wetted habitat would likely cause a minor displacement of fish species within the cofferdam area. Construction of the outfall and intake would require excavation of the riverbed and bankside. This would lead to the permanent loss of river, marginal and bankside habitat where the structures would be installed. However, once the works are complete, species would likely recolonise the area, depending on the state of the channel bed after works	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
			have taken place which may affect fish habitat. During both near bankside in-river and bankside construction, there is a risk sediment may be mobilised in the river channel, which could have an adverse effect on fish. Noise and vibration caused by barges and pile driving activities during the construction of the cofferdam within the water body have the potential to impact fish through disturbance and, in extreme cases (if there were no avoidance by the fish), may result in mortality. The introduction of construction-phase barges is unlikely to significantly impact fish along the river.	
Biological – Habitats	Thames Upper (GB530603911403)	Construction	Construction of the outfall and intake would require excavation of the riverbed and bankside. This would lead to the permanent loss of river, marginal and bankside habitat where the structures would be installed. However, once the works are complete, species would likely recolonise the area, depending on the state of the channel bed after works have been completed.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
				Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Physico-chemical – Water quality	Thames Upper (GB530603911403)	Construction	Changes in sediment transport, as well as potential release of sediments/contaminants as a result of construction may cause a localised change in water quality within the water body. Any changes in water quality will be minimal against background conditions and likely be in the form of localised plumes.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *140m south of site*	Construction	The reception shaft of the conveyance tunnel will be constructed through the overlying superficial deposits to the London Clay. At this site, the superficial deposits are not considered to be part of a recognised WFD groundwater body.	Hydrogeological Impact Assessment to confirm assumptions of radius of influence of dewatering and subsequent effects on groundwater body.

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Chemical – General chemical test			Some groundwater control measures are anticipated to be required to be undertaken at the site. However, any impacts of these measures are expected to be temporary in duration and localised to the area around the site. The effects of dewatering may extend southwards to the Lower Thames Gravels groundwater body to the south of the site. This will be confirmed through the Hydrogeological Impact Assessment that will be undertaken and reported in the ES.	
Hydromorphological	Thames Upper (GB530603911403)	Operation	Changes to velocity of flow are likely to be localised and small scale and temporary due to the nature of the Project. The impact would be localised changes to sediment transport, suspended sediment load and bedload, as well as bed morphodynamics. There is unlikely to be a change to hydromorphology quality elements however given the water body scale.	N/A
Biological – Fish	Thames Upper (GB530603911403)	Operation	There is potential for localised impacts to ecology due to the operation, including change to temperature, water quality and fish entrainment. Whilst these are localised and unlikely to impact quality elements, there will be a requirement to assess in the detailed assessment stage.	N/A

Quality element	Relevant water body/bodies	Construction/ operation	Description of impact	Possible mitigation
Biological – Habitats	Thames Upper (GB530603911403)	Operation	There is potential for localised habitat change in terms of size of footprint and quality, particularly if there are impacts to species noted in the row above. Whilst these are localised and unlikely to impact quality elements, there will be a requirement to assess in the detailed assessment stage.	N/A
Physico-chemical – Water quality	Thames Upper (GB530603911403)	Operation	Minor localised impacts to aquatic ecology are likely due to temperature and water quality changes. Whilst these are localised and unlikely to impact quality elements, there will be a requirement to assess in the detailed assessment stage.	N/A
Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area Chemical – General chemical test	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *140m south of site*	Operation	No impacts to groundwater are anticipated during the operation phase of the Project	N/A

Table A.10 Preliminary Impact Assessment – Intake structure (construction phase only)[2]

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Biological – Fish	Thames (Egham to Teddington) (GB106039023232)	Salmon can use the River Thames for migration, although numbers remain relatively low. Although there are likely potential impacts from noise and sediment disturbance, which may disrupt use of this area by certain species, this is likely to be a localised and temporary effect during construction.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Avoid fish spawning and migration period where practicable.
Biological – Invertebrates	Thames (Egham to Teddington) (GB106039023232)	Excavation of bed and bank material could potentially have an effect on the make-up and quantity of invertebrate populations due to decrease in water clarity or smothering from fine sediment. The noise and vibration from these excavations will also be a risk to invertebrates within the watercourse. These impacts would be temporary during the works period.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP.

[2] For operation phase, refer to Table A.13

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
			All pollution to be controlled under current best practice.
Biological – Macrophytes and phytobenthos	Thames (Egham to Teddington) (GB106039023232)	Intake construction-related disturbance of the bed and bank, increased sedimentation, decreased water clarity, and localised flow variations may all have an impact on the number and composition of macrophytes and phytobenthos. The vibration from these excavations will also be a risk to macrophytes within the watercourse. Impacts are seen as minimal risk at the water body size as changes are thought to be extremely localised and restricted to the activity. The impact would be negligible.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – Connection to groundwater	Thames (Egham to Teddington) (GB106039023232)	There is unlikely to be an impact to groundwater connection as a result of construction of these activities.	N/A
Hydromorphological – Quantity and dynamics of flow	Thames (Egham to Teddington) (GB106039023232)	Changes in flow dynamics may occur locally as a result of bank material excavation. These effects would result from localised changes in flow turbulence caused by enabling works, such as the removal of riparian and emergent vegetation, and not change overall river flow. Given the size of a water body, the effects would be minimal and mostly localised to the building activity.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP.

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
			All pollution to be controlled under current best practice.
Hydromorphological – River depth and width variation	Thames (Egham to Teddington) (GB106039023232)	Construction of the intake structure at the bank or near the bank of the River Thames could lead to some localised impact on the geomorphology of the channel bank and bed. The securing of a dry working area at the intake would directly impact the bank and bed of the River Thames, however, as the impacted areas are small in the context of the width of the river and not expected to interrupt geomorphological processes outside within the remaining river.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – Structure and substrate of the riverbed	Thames (Egham to Teddington) (GB106039023232)	Construction of the intake at the Burnell Avenue site may require cofferdams and cutting through the riverbank. A cofferdam would include temporary support piles and sheet piling with subsequent removal of water from within the structure. There may be sediment release as a result but it is expected this will be minimised by site working practices with quantities expected not to be detectable against the natural fluctuations in sediment in the freshwater River Thames and would not have an impact on water quality.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
			Measures will be taken to prevent excess sediment spillage or disturbance into the watercourse.
Hydromorphological: Structure of the riparian zone	Thames (Egham to Teddington) (GB106039023232)	It is likely that there would be some vegetation clearance to make way for the working area and construction of the intake. Vegetation clearance and soil compaction during construction can reduce surface water penetration and impede riparian vegetation re-establishment. However the adjacent banks are likely to be sheet-piled so this impact would be negligible and limited to the works area.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Physico-chemical – Oxygenation conditions and Nutrient	Thames (Egham to Teddington) (GB106039023232)	Construction of the shafts at the Burnell Avenue site would involve excavation through the superficial deposits. There is a risk of soil mobilisation which could otherwise lead to increased suspended solids within any surface water runoff generated from the area of works. Cofferdam installation could generate changes in water quality due to the release of suspended sediment and/or contaminants.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Quantitative – Water balance Quantitative – Dependent surface WFD water body status Chemical – Drinking water protected area Chemical – General chemical test	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *140m south of site*	No impacts to groundwater are anticipated during the construction of the intake structure.	N/A

Table A.11 WFD Preliminary Impact Assessment – Outfall structure (near bankside in-river option and construction phase only[3])

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Biological – Fish	Thames (Egham to Teddington) (GB106039023232)	Although there are likely potential impacts from noise, vibration and sediment disturbance, this is likely to be a localised and temporary effect during construction. There is also likely to be an impact to water quality which could affect fish mobility and quality of habitat.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

[3] For operation phase, refer to Table A.13

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Biological – Invertebrates	Thames (Egham to Teddington) (GB106039023232)	Excavation of bed and bank material could potentially have an effect on the make-up and quantity of invertebrate populations due to decrease in water clarity or smothering from fine sediment. The noise and vibration from these excavations will also be a risk to invertebrates within the watercourse. These impacts would be temporary during the works period.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Biological – Macrophytes and phytobenthos	Thames (Egham to Teddington) (GB106039023232)	Outfall construction-related disturbance of the bed and bank, increased sedimentation, decreased water clarity, and localised flow variations may all have an impact on the number and composition of macrophytes and phytobenthos. The vibration from these excavations will also be a risk to macrophytes within the watercourse. Impacts are seen as minimal risk at the water body size as changes are thought to be extremely localised and restricted to the activity. The impact would be negligible.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – Connection to groundwater	Thames (Egham to Teddington) (GB106039023232)	It is not anticipated that there would be any change to the groundwater connection	N/A

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
		from the surface water as a result of outfall construction.	
Hydromorphological – Quantity and dynamics of flow	Thames (Egham to Teddington) (GB106039023232)	Changes in flow dynamics may occur locally as a result of bank material excavation. These effects would result from localised changes in flow turbulence caused by enabling works, such as the removal of riparian and emergent vegetation, and not change overall river flow. Given the size of a water body, the effects would be minimal and mostly localised to the building activity.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological – River depth and width variation	Thames (Egham to Teddington) (GB106039023232)	The outfall has the possibility of affecting various hydromorphological elements such as river widths and depths, structure and substrate and riparian zone, although as the banks are already sheet piled, this impact would be minimal. These works could also cause issues such as sediment disruption which in turn would affect other quality elements included within this assessment.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Hydromorphological – Structure and substrate of the riverbed	Thames (Egham to Teddington) (GB106039023232)	During construction, fine silt may be discharged into the water body potentially burying local bed substrate material. This may result in bed substrate uniformity and lower coarse-to-fine sediment ratios across water bodies. On a water body scale, these effects are negligible.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Hydromorphological: Structure of the riparian zone	Thames (Egham to Teddington) (GB106039023232)	It is likely that there would be some vegetation clearance to make way for the working area and construction of the outfall. Vegetation clearance and soil compaction during construction can reduce surface water penetration and impede riparian vegetation re-establishment. However the adjacent banks are likely to be sheet-piled so this impact would be negligible and limited to the works area.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Physico-chemical: Oxygenation conditions	Thames (Egham to Teddington) (GB106039023232)	There is the potential for localised decline in water quality elements associated with construction of the outfall and other activities, including dissolved oxygen. This	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9)

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
		is mainly due to potential release of sediments/discharge from construction activities.	aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
Groundwater Quantitative – water balance Quantitative – dependent surface WFD water body status Chemical – drinking water protected area Chemical – General chemical test	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *140m south of site*	No impacts to groundwater are anticipated during the construction of the outfall structure.	N/A

Table A.12 WFD Preliminary Impact Assessment – Outfall structure (bankside option and construction phase only[4])

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Biological – Fish	Thames (Egham to Teddington) (GB106039023232)	Although there are likely potential impacts from noise, vibration and sediment disturbance, this is likely to be a localised and temporary effect during	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9)

[4] For operation phase, refer to Table A.13

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
		construction. There is also likely to be an impact to water quality which could affect fish mobility and quality of habitat.	aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. The proposals should incorporate or be cognisant of (wherever possible) water depth that allows uninterrupted fish passage. Although this disturbance is present, this effect is on a minor scale and will be temporary so is not thought to cause any issues towards WFD.
Biological – Invertebrates	Thames (Egham to Teddington) (GB106039023232)	Excavation of bed and bank material could potentially have an effect on the make-up and quantity of invertebrate populations due to decrease in water clarity or smothering from fine sediment. The noise and vibration from these excavations will also be a risk to invertebrates within the watercourse. These impacts would be temporary during the works period.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary so is

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
			not thought to cause any issues towards WFD.
Biological – Macrophytes and phytobenthos	Thames (Egham to Teddington) (GB106039023232)	Outfall construction-related disturbance of the bed and bank, increased sedimentation, decreased water clarity, and localised flow variations may all have an impact on the number and composition of macrophytes and phytobenthos. The noise and vibration from these excavations will also be a risk to macrophytes within the watercourse. Impacts are seen as minimal risk at the water body size as changes are thought to be extremely localised and restricted to the activity. The impact would be negligible.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary so is not thought to cause any issues towards WFD.
Hydromorphological – Connection to groundwater	Thames (Egham to Teddington) (GB106039023232)	It is not anticipated that there would be any change to the groundwater connection from the surface water as a result of outfall construction.	N/A
Hydromorphological – Quantity and dynamics of flow	Thames (Egham to Teddington) (GB106039023232)	Changes in flow dynamics may occur locally as a result of bank material excavation. These effects would result from localised changes in flow turbulence caused by enabling works, such as the removal of riparian and emergent vegetation, and not change overall river	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity.

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
		flow. Given the size of the water body, the effects would be minimal and mostly localised to the building activity.	Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary so is not thought to cause any issues towards WFD.
Hydromorphological – River depth and width variation	Thames (Egham to Teddington) (GB106039023232)	The outfall has the possibility of affecting river dimensions, this impact would be minimal. These works could also cause issues such as sediment disruption which in turn would affect other quality elements included within this assessment.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary so is not thought to cause any issues towards WFD.
Hydromorphological – Structure and	Thames (Egham to Teddington) (GB106039023232)	During construction, fine silt may be discharged into the water body potentially burying local bed substrate	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
substrate of the riverbed		material. This may result in bed substrate uniformity and lower coarse-to-fine sediment ratios across water bodies. On a water body scale, these effects are negligible.	enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary so is not thought to cause any issues towards WFD.
Hydromorphological: Structure of the riparian zone	Thames (Egham to Teddington) (GB106039023232)	It is likely that there would be some vegetation clearance to make way for the working area and construction of the outfall. Vegetation clearance and soil compaction during construction can reduce surface water penetration and impede riparian vegetation re-establishment. However the adjacent banks are likely to be sheet-piled so this impact would be negligible and limited to the works area.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary so is

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
			not thought to cause any issues towards WFD.
Physico-chemical – Oxygenation conditions	Thames (Egham to Teddington) (GB106039023232)	There is the potential for localised decline in water quality elements associated with construction of the outfall and other activities, including dissolved oxygen. This is mainly due to potential release of sediments/discharge from construction activities.	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species, water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice. Although this disturbance is present, this effect is on a minor scale and will be temporary, therefore it is not thought to cause any issues towards WFD.
Groundwater Quantitative – water balance Quantitative – dependent surface WFD water body status Chemical – drinking water protected area	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300) *140m south of site*	No impacts to groundwater are anticipated during the construction of the outfall structure.	N/A

Quality element	Relevant water body/bodies	Description of impact	Possible mitigation
Chemical – General chemical test			

Table A.13 WFD Preliminary Impact Assessment – Recycled water conveyance tunnel, pipeline, intake structure and outfall structure (bankside and near bankside in-river options) Operation phase only[5]

Quality element	Relevant water body/bodies	Description of impact
Biological – All scoped in elements	Thames (Egham to Teddington) (GB106039023232)	During operation, at the intake, there is potential for sediment remobilisation which could lead to change in habitat and potential change in species distribution, number and quality. This is considered to be negligible with no impacts on a water body scale. Discharge of recycled water will result in localised changes in flow patterns that could alter the abundance and composition of aquatic fauna. There is the potential for habitat changes from, modified flow patterns, loss of lateral connectivity and potential water quality barriers to fish movement. However, impacts are likely to be negligible. Bed and bank erosion following the discharge of water from the outfall would lead to fine sediment entrainment which could change habitat coverage. This is also likely to be a negligible and temporary impact. Changes in water quality downstream of the outfall are temporary and localised and dissipated outside of the mixing zone. Any effects at water body level are not expected to occur. Potential bed and bank erosion following the discharge of water from the outfall could lead to fine sediment entrainment which could change habitat coverage. This is also likely to be a negligible and temporary impact. The effects of the operation of the outfall on aquatic ecology include potential impacts on water quality, water temperature and velocities in the Thames and Thames Upper downstream of the outfall. It is expected that there will be an effect on thermal conditions within the watercourses. These thermal conditions could affect macrophyte and macroalgae communities.

[5] This table only discuss the operational impacts. The mitigations section has been removed as they are not applicable.

Quality element	Relevant water body/bodies	Description of impact
		Modelling and review of PEI Report Chapter 6: Aquatic Ecology describes the baseline situation and the impacts during operation. Under typical river flow conditions the Project would operate under (58% of the Project operation would be at 700–799Ml/d), with the mean river temperature of 16.9°C. At the lowest flow scenario (300Ml/d), the Project would discharge at freshwater River Thames temperatures of 13.0°C (mean). The species composition recorded around the Burnell Avenue site is not likely to be sensitive to small, temporary increases in temperature. There would be a negligible impact on species within the water body. Modelling and review of PEI Report Chapter 6: Aquatic Ecology describes the baseline situation and the impacts during operation. The species composition recorded around the Burnell Avenue site is not likely to be sensitive to small, temporary increases in temperature. There would be a negligible impact on species within the water body.
Hydromorphological – All scoped in elements	Thames (Egham to Teddington) (GB106039023232)	Flow will be affected at the outfall structure due to the new discharged water entering the watercourse. Although this new flow could affect sediment and velocities within the watercourse, these effects will not be on a WFD level and therefore will be negligible. Only very slight flow velocity reductions are anticipated, with negligible effects on hydrodynamics and morphological processes within the short, depleted reach. Decreased river flow between the intake and outfall is expected to result in no discernible change to water levels due to the control of levels within this reach of the Thames. Velocity increases from the outfall at the Burnell Avenue site are anticipated to be small in magnitude, localised and infrequent. The macrophyte species assemblage along this part of the River Thames is not likely to be sensitive to

Quality element	Relevant water body/bodies	Description of impact
		the magnitude of velocity increases predicted from the operation of both designs for the Burnell Avenue site. There would also be localised velocity increases along the marginal habitat downstream of the outfall. This would be a negligible impact.
Physico-chemical – All scoped in elements	Thames Upper (GB530603911403)	Under all scenarios for the near bankside in-river design, a greater than 2°C increase in temperature would not exceed 7.7% of the channel cross-section. Velocities of greater than 0.05m/s would not exceed 3% of the channel cross-section. Under maximum ambient temperatures, the recycled water from the outfall would be a lower temperature than ambient river temperatures. Temperatures and velocity changes would be localised and fully mixed with the water in the River Thames upstream of Teddington Weir. Changes to temperatures in the tidal River Thames below Teddington Weir would be less than above the weir, with no change in 10^{th} or 90^{th} percentile temperatures and no significant change in temperature profiles (Appendix 5.1). Temperature increases are likely to be small, localised, and infrequent. There would be reduced localised temperature increases along the marginal habitat downstream of the outfall in comparison to the bankside option. Increases in phosphorus and ammonia are anticipated to be negligible, and dissolved oxygen could be slightly reduced during the operation. However, the overall dissolved oxygen concentration would remain high. Under maximum temperature extremes in summer, recycled water is predicted to discharge at a lower temperature than ambient river temperature (see Chapter 6: Aquatic Ecology and Appendix 6.2). It is expected there will be negligible change to water quality outside of the immediate mixing zone (the discharge would be fully mixed upstream of Teddington Weir). This will be considered further at Stage 3b.There is the potential for localised and temporary decline in water quality elements

Quality element	Relevant water body/bodies	Description of impact
		associated with discharge (such as pH). Impacts would likely be localised and negligible on a water body scale.
Biological – Fish	Thames Upper (GB530603911403)	Effects on freshwater, estuarine and migratory fish or their behaviour as a result of water quality changes has been assessed and described in Chapter 6: Aquatic Ecology. There is no likely change in velocity, water levels, or water quality downstream of Teddington Weir, and there would be no net change in pass forward flow over Teddington Weir. There may be a 1°C increase compared to baseline temperatures under certain low flow scenarios downstream of Teddington Weir. It is unlikely that an irregular, temporary 1°C increase downstream of Teddington Weir would affect species downstream of the weir for both outfall options. Fish communities could be impacted through increases in temperature or velocity and changes in water quality, including effects on olfaction. As the operation is expected to be only an extremely exceptional occurrence from February to May (inclusive), the corresponding windows for downstream migration of smelt, shad, lamprey and salmonids, which occur over these months, would be avoided with no negative impact on these species. Although the downstream migration of adult European eel coincides with the operational timings of the Project, it is considered unlikely that Project operation would impact their seaward migration. This is because they exhibit negatively rheotactic swimming behaviour during their downstream migration, meaning they swim with the current rather than against it. Therefore, adult European eel on their seaward migration will not be impeded.
Biological – Habitats	Thames Upper (GB530603911403)	Only very slight flow velocity reductions are anticipated within the Thames Upper as a result of operation. This may have a slight impact on marginal habitat or subtidal habitat within the water body. No sediment movement or scouring is anticipated to take place. Species may be more sensitive to changes in velocity, particularly less mobile species like mussels, as they

Quality element	Relevant water body/bodies	Description of impact
		would be unable to move away from the affected location to areas with more suitable velocities.
Hydromorphological	Thames Upper (GB530603911403)	Increases in velocity are anticipated to be small and no sediment movement or scouring is anticipated to take place. The highest impact from the operation is anticipated to be very localised, and the overall impact would be temporary and infrequent.
Physico-chemical – Water quality	Thames Upper (GB530603911403)	Changes in water quality due to operation at the Burnell Avenue site are deemed negligible below Teddington Weir (Appendix 5.1). Any increases would be small in the context of the Thames system and short in extent as they would be expected to revert to baseline conditions when operation ceases. Increases in phosphorus and ammonia from the two outfall options are anticipated to also be small again due to the intermittent and temporary nature of the Project operation, which is unlikely to cause permanent changes to long-term phosphorus and ammonia levels in the River Thames. Dissolved oxygen could be slightly reduced. However, the overall dissolved oxygen concentration would remain high and would not impact species downstream of the outfall. In summary, changes to water parameters, including oxygen, ammonia, biochemical oxygen demand and suspended solids, have been predicted to be small, with no deterioration in WFD status in physico-chemical quality elements.
Groundwater – All scoped in elements	None in the immediate vicinity of the site. Lower Thames Gravels (GB40603G000300)	No impacts to groundwater are anticipated during the operation phase of the Project.

Quality element	Relevant water body/bodies	Description of impact
	140m south of site	

Water discharge impact (including change in water quality) on: Lockwood Reservoir

Table A.14 WFD Preliminary Impact Assessment

Quality element	Relevant water body/bodies	Construction /operation	Description of impact	Possible mitigation
Groundwater Quantitative – Water balance	Lockwood Reservoir (GB30641865)	Construction	There will be no changes for the reservoirs during the construction phase of the Project because the existing TLT would be used.	N/A
Reservoir Physico-chemical – All elements	Lockwood Reservoir (GB30641865)	Construction	There will be no changes for the reservoirs during the construction phase of the Project.	N/A
Ground water Quantitative – Water balance	Lockwood Reservoir (GB30641865)	Operation	The water balance regime is unlikely to change as a result of water discharge impact due to the Project's water resource regime.	N/A
Reservoir Physico-chemical – All elements	Lockwood Reservoir (GB30641865)	Operation	Total phosphorus and nitrogen are currently classified as bad in the Catchment Data Explorer, see Table A.18. Reservoir water quality phosphates and nitrates likely to increase. Phosphorus and nitrogen promote algae and aquatic plant growth leading to a depletion of dissolved oxygen,	Mitigation is usually increased drinking water treatment, managing storm water runoff up-catchment

Quality element	Relevant water body/bodies	Construction /operation	Description of impact	Possible mitigation
			harming aquatic life and creating anoxic conditions devoid of life through eutrophication. Additionally, certain algal blooms, particularly those involving cyanobacteria, can produce toxins harmful to humans. Any biological elements can decrease in quality, quality and undergo increased risk of morbidity due to depletion in dissolved oxygen and resultant anoxic conditions. The detail of these impacts will be explored in Stage 3(b).	

All activities

Table A.15 WFD Preliminary Impact Assessment – Protected areas and INNS

Quality element	Relevant water body/bodies	Construction /operation	Description of impact	Possible mitigation
Protected areas	All surface water bodies	Both during construction and operation	A separate Appendix 7.1: HRA – Stage 1 Screening has been undertaken and submitted. The conclusions state that there will only be a Stage 2 assessment at Richmond Park SAC, Ham Lands (and for the compounds) specifically based on potential impacts on the stag beetle during the construction phase. A	Embedded mitigation and standard good practice in Section 6.4 of PEI Report Chapter 6: Aquatic Ecology and enhancement measures (Section 6.9) aim to minimise effects on aquatic species,

Quality element	Relevant water body/bodies	Construction /operation	Description of impact	Possible mitigation
			Stage 2 Appropriate Assessment is required for this site. The conclusions overall state that there will be no in-combination effects or effects on Wimbledon Common SAC, South West London Waterbodies SPA and Ramsar, Thames Estuary and Marshes SPA and Ramsar and Lee Valley SPA and Ramsar. See HRA for further information.	water quality, INNS and biodiversity. Implementation of standard good practice and by adhering to the draft CoCP. All pollution to be controlled under current best practice.
INNS		Both during construction and operation	Construction methods have the potential to facilitate the spread of INNS to and from sites via seeds, plant fragments and eggs. INNS can be introduced or may proliferate following ground clearing during construction due to reduced competition from other native species. There is potential for an increase in the severity of impacts of INNS when they are transferred over larger distances, as it increases the risk of establishing new populations in areas where they were not previously present.	With the implementation of standard good practice, the impact of INNS can be managed and/or reduced.

A.7 Conclusions

A.7.1 This report has been produced to provide a preliminary assessment of the Teddington Direct River Abstraction Project under the requirements of the WFD Regulations.

A.7.2 The following water bodies have been identified and assessed in terms of whether there is a likely impact from Project activities during construction and operation to quality elements, and therefore water body status:

a. Thames (Egham to Teddington) (ID: GB106039023232)

b. Thames Upper (ID: GB530603911403)

c. Lockwood Reservoir (ID: GB30641865)

d. Lower Thames Gravels Ground Water Body (ID: GB40603G000300)

A.7.3 Those activities versus quality elements that are scoped into Stage 2 are taken through to a preliminary impact assessment (Stage 3(a)) which indicates the likely impacts of the activities and recommendations for appropriate mitigation. Those impacts that could cause a change to water body status, or those deemed necessary to assess at a higher resolution will be taken through to Stage 3(b) detailed impact assessment.

A.7.4 There is some impact expected for all quality elements due to the discharge of the recycled water, although for hydromorphology, the impact seems less for Thames (Egham to Teddington) and Thames Upper water bodies. The detail of these impacts will be explored in Stage 3(b).

A.7.5 The water quality in the Upper Thames is considered likely to improve due to the reduction in the discharge rate from Mogden STW associated with the Project size (75Ml/d). The impact will be discussed further in Stage 3(b).

A.7.6 The Lockwood Reservoir is also included due to water quality impacts as a result of potential risks from phosphates and nitrates. This will also be picked up further in Stage 3(b).

A.7.7 Groundwater assessment will be undertaken as part of the ES. The data and impacts from this will also be included in Stage 3(b) for the groundwater body (Lower Thames Gravels).

A.7.8 A separate Appendix 7.1: HRA – Stage 1 Screening has been undertaken and submitted as part of the requirement to assess impacts to protected areas and other Conservation of Habitats and Species Regulations 2017. The conclusions state that there will only be a Stage 2 assessment at Richmond Park SAC, Ham Lands (and for the compounds) related to the potential for construction impacts on the stag beetle. The conclusions overall state that there will be no in-combination effects; and no alone effects. See HRA for further information.

A.8 References

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Annex A1. Environment Agency Classification of Water Bodies Included in ZoI

The following tables present the Environment Agency classification of water bodies included in the ZoI. These are taken from the Environment Agency's online Catchment Data Explorer for the following web pages:

https://environment.data.gov.uk/catchment-planning/WaterBody/GB106039023232

https://environment.data.gov.uk/catchment-planning/WaterBody/GB530603911403

https://environment.data.gov.uk/catchment-planning/WaterBody/GB30641865

https://environment.data.gov.uk/catchment-planning/WaterBody/GB30647003

https://environment.data.gov.uk/catchment-planning/WaterBody/GB30641884

https://environment.data.gov.uk/catchment-planning/WaterBody/GB40603G000300

Table A.16 Environment Agency classification of water body included in the ZoI (2022 classification – Thames (Egham to Teddington))

Thames (Egham to Teddington) GB106039023232	
Classification Item	2022
Heavily Modified Designation	Heavily Modified
Ecological	Poor
Biological quality elements	Poor
Fish	-
Invertebrates	High
Macrophytes and Phytobenthos Combined	Poor
Macrophytes Sub Element	High
Phytobenthos Sub Element	Poor
Physico-chemical quality elements	Moderate
Acid Neutralising Capacity	High
Ammonia (Phys-Chem)	High
Biochemical Oxygen Demand	Good
Dissolved oxygen	Good
Phosphate	Moderate
Temperature	Moderate
pH	High
Supporting elements (Surface Water)	Moderate

Thames (Egham to Teddington) GB106039023232	
Hydrological Regime	-
Mitigation Measures Assessment	Moderate or less
Specific pollutants: • Arsenic • Chlorothalonil • Copper • Diazinon • Dimethoate • Iron • Manganese • Pendimethalin • Zinc	High
Chemical	Does not require assessment
Priority hazardous substances	Does not require assessment
Priority substances	Does not require assessment
Other pollutants	Does not require assessment

Table A.17 Environment Agency classification of water body included in the ZoI (2022 classification – Thames Upper)

Thames Upper Water Body GB530603911403	
Classification Item	2022
Heavily Modified Designation	Heavily Modified
Ecological	Moderate
Biological quality elements	Good
Fish	Good
Phytoplankton	Good
Physico-chemical quality elements	Good
Dissolved oxygen	Good
Hydromorphological Supporting Elements	Supports Good
Hydrological Regime	Does not support Good
Supporting elements (Surface Water)	Moderate
Mitigation Measures Assessment	Moderate or less
Specific pollutants	Moderate

Thames Upper Water Body GB530603911403	
2,4-dichlorophenol	High
Copper, Diazinon, Dimethoate, Iron Linuron, Mecoprop Pendimethalin, Permethrin, Phenol, Toluene, Triclosan	High
Zinc	Moderate
Chemical	Does not require assessment
Priority hazardous substances	Does not require assessment
Priority substances	Does not require assessment
Other Pollutants	Good

Table A.18 Environment Agency classification of water bodies included in the ZoI (2022 classification – Lockwood Reservoir and Lower Thames Gravels (2019 only))

Lockwood Reservoir GB30641865		Lower Thames Gravels (Groundwater) GB40603G000300	
Classification Item	2022	Classification Item	2019 (cycle 3)
Heavily Modified Designation	Artificial	Overall Water Body	Poor
Ecological	Moderate	Quantitative	Poor
Biological quality elements	High	Quantitative Status element	Poor
Phytoplankton	High	Quantitative Dependent Surface Water Body Status	Good
Physico-chemical quality elements	Moderate	Quantitative GWDTEs test	Good
Salinity	High	Quantitative Saline Intrusion	Good
Total Nitrogen	Bad	Quantitative Water Balance	Poor
Total Phosphorus	Bad	Chemical (GW)	Good
Supporting elements (Surface Water)	Moderate	Chemical Status element	Good
Expert Judgement	Moderate	Chemical Dependent Surface Water Body Status	Good
Mitigation Measures Assessment	Good	Chemical Drinking Water Protected Area	Good
Specific pollutants	High	Chemical GWDTEs test	Good
Copper	High	Chemical Saline Intrusion	Good
Chemical	Does not require assessment	General Chemical Test	Good
Priority hazardous substances	Does not require assessment	Supporting elements (Groundwater)	
Priority substances	Does not require assessment	Prevent and Limit Objective	Active
Other Pollutants	Does not require assessment	Trend Assessment	No trend

Table A.19 Environment Agency classification of water bodies included in the ZoI (2019 classification – High Maynard and Banbury Reservoir)

High Maynard Reservoir GB30641884		**Banbury Reservoir GB30647003**	
Classification Item	2022		2019
Heavily Modified Designation	Artificial	Heavily Modified Designation	Artificial
Ecological	Moderate	Ecological	Moderate
Biological quality elements	Moderate	Biological quality elements	-
Phytoplankton	Moderate	Phytoplankton	-
Physico-chemical quality elements	Moderate	Physico-chemical quality elements	-
Salinity	High	Salinity	-
Total nitrogen	Bad	Total nitrogen	-
Total phosphorous	Bad	Total phosphorous	-
Supporting elements (Surface Water)	Moderate	Supporting elements (Surface Water)	Moderate
Expert Judgement	Moderate	Expert Judgement	Moderate
Mitigation Measures Assessment	Good	Mitigation Measures Assessment	Good
Chemical	Does not require assessment	Chemical	Does not require assessment
Priority hazardous substances	Does not require assessment	Priority hazardous substances	Does not require assessment
Priority substance	Does not require assessment	Priority substances	Does not require assessment
Other Pollutants	Does not require assessment	Other Pollutants	Does not require assessment