Thames to Affinity Transfer

Technical Supporting Document B4

Strategic Environmental Assessment Review

Notice

Position Statement

- This document has been produced as the part of the process set out by RAPID for the development of the Strategic Resource Options (SROs). This is a regulatory gated process allowing there to be control and appropriate scrutiny on the activities that are undertaken by the water companies to investigate and develop efficient solutions on behalf of customers to meet future drought resilience challenges.
- This report forms part of suite of documents that make up the 'Gate 2 submission.' That submission details all the work undertaken by Thames Water and Affinity Water in the ongoing development of the proposed SROs. The intention of this stage is to provide RAPID with an update on the concept design, feasibility, cost estimates and programme for the schemes, allowing decisions to be made on their progress and future funding requirements.
- Should a scheme be selected and confirmed in the companies' final Water Resources Management Plan, in most cases it would need to enter a separate process to gain permission to build and run the final solution. That could be through either the Town and Country Planning Act 1990 or the Planning Act 2008 development consent order process. Both options require the designs to be fully appraised and in most cases an environmental statement to be produced. Where required that statement sets out the likely environmental impacts and what mitigation is required.
- Community and stakeholder engagement is crucial to the development of the SROs. Some high level activity has been undertaken to date. Much more detailed community engagement and formal consultation is required on all the schemes at the appropriate point. Before applying for permission Thames Water and Affinity Water will need to demonstrate that they have presented information about the proposals to the community, gathered feedback and considered the views of stakeholders. We will have regard to that feedback and, where possible, make changes to the designs as a result.
- The SROs are at a very early stage of development, despite some options having been considered for several years. The details set out in the Gate 2 documents are still at a formative stage and consideration should be given to that when reviewing the proposals. They are for the purposes of allocating further funding not seeking permission.

Disclaimer

This document had been written in line with the requirements of the RAPID Gate 2 Guidance and to comply with the regulatory process pursuant to Thames Water's and Affinity Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in this document be taken forward, Thames Water and Affinity Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This document should be read with those duties in mind.

Contents

Glossary

Term	Definition
Agricultural Land Classification (ALC)	ALC provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. It classifies agricultural land in five categories according to versatility and suitability for growing crops: • Grade 1 – excellent quality agricultural land • Grade 2 – very good quality agricultural land • Grade 3 – split into Subgrade 3a of good quality agricultural land, and Subgrade 3b of moderate quality agricultural land • Grade 4 – poor quality agricultural land • Grade 5 – very poor quality agricultural land Grades 1, 2 and 3a are classed as best and most versatile (BMV) and greater consideration of these soil resources are made during planning applications.
Area of Outstanding Natural Beauty (AONB)	Land protected by the Countryside and Rights of Way Act 2000 on account of factors such as landscape or scenic quality, relative wildness or tranquility, and / or natural or cultural heritage features. It protects the land to conserve and enhance its natural beauty. (Source: Natural England)
Biodiversity Net Gain (BNG)	Biodiversity Net Gain is an approach to development that leaves biodiversity in a measurably better state than before.
Conservation Area	Defined by the Planning (Listed Buildings and Conservation Areas) Act 1990 as an area 'of special architectural or historic interest, the character of which it is desirable to preserve or enhance'.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.

Term	Definition
Construction Environmental Management Plan (CEMP)	A document which sets out site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the construction phase of the project.
Demolition	Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.
Environmental Impact Assessment (EIA)	Statutory process under (for the Proposed Scheme) the Town and Country Planning (EIA) Regulations 2017 (as amended), consisting of: 1. Preparation of an Environmental Statement 2. Consultation 3. Examination by the competent authority of the information contained within the Environmental Statement 4. The reasoned (justified or evidenced) conclusion by the competent authority on the significant effects of the project on the environment 5. The reasoned (justified or evidenced) decision by the competent authority to grant or refuse development consent.
European Site	Refers to European Sites in the UK's National Site Network including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), proposed and candidate SPAs and SACs (pSPAs and cSACs).
Habitat	A place where an organism or community of organisms normally live.
Heavy Duty Vehicle (HDV)	Goods vehicles and buses greater than 3.5 tonne (t) gross vehicle weight.
Light Duty Vehicle (LDV)	Cars and small vans less than 3.5 t gross vehicle weight.
National Nature Reserve (NNR)	A statutory designation afforded to land declared under the National Parks and Access to the Countryside Act 1949 or Wildlife and Countryside Act (1981) as amended and include some of the best examples of wildlife and geology.

Term	Definition
Ramsar	Wetland sites of international importance.
Risk	The likelihood of an adverse event occurring.
Scheduled Monument	A monument which has been scheduled is protected against disturbance. The Secretary of State must be informed about any work which might affect a monument above or below ground, and English Heritage gives advice to the Government on each application. In assessing each application, the Secretary of State will try to ensure that damage done to protected sites is kept to a minimum.
Site of Special Scientific Interest (SSSI)	Sites of Special Scientific Interest represent the best examples of habitats present within the UK, and the designation provides statutory protection and a duty for the landowner to maintain the habitats
Special Area of Conservation (SAC)	Special Areas of Conservation are strictly protected sites designated under the EC Habitats Directive.
Special Protection Areas (SPA)	Special Protection Areas are protected areas for birds in the UK classified under: • the Wildlife & Countryside Act 1981 (as amended) and the Conservation (Natural Habitats, & c.) Regulations 2010 (as amended) in England, Scotland and Wales, • the Wildlife (Northern Ireland) Order 1985; the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985; the Conservation (Natural Habitats, &c.) (Northern Ireland) Regulations 1995 (as amended) in Northern Ireland, • the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) in the UK offshore area, and • other legislation related to the uses of land and sea.

Abbreviations

Abbreviation	Full term
AA	Appropriate Assessment
ACWG	All Company Working Group
ALC	Agricultural Land Classification
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
BNG	Biodiversity Net Gain
BRI	Beckton Reuse Indirect
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DRA	Direct River Abstraction
EAR	Environmental Appraisal Report
EIA	Environmental Impact Assessment
GIS	Geographical Information System
GWDTE	Groundwater Dependant Terrestrial Ecosystems
HDV	Heavy Duty Vehicle
HGV	Heavy Goods Vehicle
HRA	Habitats Regulations Assessment
IMD	Index of Multiple Deprivation
INNS	Invasive non-native species
LDV	Light Duty Vehicle
LNR	Local Nature Reserve
LSE	Likely Significant Effects
LTR	Lower Thames Reservoir
LWS	Local Wildlife Sites

Abbreviation	Full term
MCZ	Marine Conservation Zone
MPA	Marine Protection Area
NCA	National Character Area
NNR	National Nature Reserve
NSIP	Nationally Significant Infrastructure Project
PM	Particulate matter
RAPID	Regulators' Alliance for Progressing Infrastructure Development
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SPA	Special Protection Area
SPZ	Source Protection Zone
SRO	Strategic Resource Option
SSSI	Site of Special Scientific Interest
STW	Sewage Treatment Works
T2AT	Thames to Affinity Transfer
ToLS	Test of Likely Significance
TPO	Tree Preservation Order
UK	United Kingdom
UKCP18	UK Climate Projections 2018
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WRSE	Water Resources South East
WRZ	Water Resource Zone
WTW	Water Treatment Works
ZoI	Zone of Influence

Executive summary

The Strategic Environmental Assessment (SEA) review supports the Gate 2 submission report to Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the Thames to Affinity Transfer (T2AT) Strategic Resource Option (SRO). This report presents the findings of the SEA level option applied to the Lower Thames Reservoir and Beckton Reuse Indirect Options for T2AT.

Water Resources South East (WRSE) undertook an SEA in January 2021, in-line with the methodology in the WRSE Regional Plan Environmental Assessment Methodology Guidance[1].

The approach to the SEA is aligned with the WRSE Regional Plan environmental assessment process. The Environmental Appraisal Reports (EARs) developed for each option alongside the Habitat Regulations Assessment (HRA) and Water Framework Directive (WFD) assessment have fed into the SEA. The EARs are presented in Technical Supporting Document B1a, Environmental Appraisal Report (Lower Thames Reservoir Option) and Technical Supporting Document B1b, Environmental Appraisal Report (Beckton Reuse Indirect Option). The HRA and WFD are presented separately in Technical Supporting Document B2, Habitats Regulations Assessment and Technical Supporting Document B3, Water Framework Directive, respectively. This SEA has involved the identification of potential effects for each SEA objective at both the construction and operational phases, pre and post mitigation, with each SEA objective scored against an eight-point scale. The SEA objectives are presented in the table below.

SEA topic	SEA objective
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)
Soil	Protect and enhance the functionality, quantity and quality of soils
Water	Increase resilience and reduce flood risk
	Protect and enhance the quality of the water environment and water resources
	Deliver reliable and resilient water supplies

[1] Mott MacDonald (2020). Water Resources South East (WRSE) Regional Plan Environmental Assessment Methodology Guidance. https://www.wrse.org.uk/media/lb0g0tsr/wrse_file_1347_wrse-regional-plan-environmental-assessment-methodology-guidance.pdf [last accessed October 2022]

SEA topic	SEA objective
Air	Reduce and minimise air emissions
Climatic factors	Reduce embodied and operational carbon emissions
	Reduce vulnerability to climate change risks and hazards
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity
Historic environment	Conserve, protect and enhance the historic environment, including archaeology
Population and human health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
	Maintain and enhance tourism and recreation
Material assets	Minimise resource use and waste production
	Avoid negative effects on built assets and infrastructure

The effects identified as part of the SEA for the construction and operational phases of both the Lower Thames Reservoir and Beckton Reuse Indirect Options are described below.

Major positive effects have been identified for both options for the SEA objective on delivering reliable and resilient water supplies given the options improve the transfer of water across regions.

Carbon would be generated as a result of construction as well as during operation as a result of both options. The SEA identified minor negative effects (pre and post mitigation) associated with carbon emissions during the construction phase and moderate negative effects (pre and post mitigation) during the operational phase for both options.

Major negative effects (pre-mitigation) and moderate negative effects (post-mitigation) were identified for biodiversity, flora and fauna for the construction and operation of the Beckton Reuse Indirect Option given the new intake is located within the Chingford Reservoir Site of Special Scientific Interest (SSSI). There is potential for effects on internationally and nationally designated sites, and potential impacts on priority habitat and woodland for both options. The HRA Test of Likely Significance (ToLS) for the Lower Thames Reservoir Option identified potential Likely Significant Effects (LSE) on the South West London Waterbodies Special Protection Area (SPA) and Ramsar site therefore HRA Appropriate Assessment (AA) was undertaken. The AA identified no adverse effects on the integrity of the South West London Waterbodies SPA and Ramsar, with the implementation

of appropriate mitigation. The HRA ToLS for the Beckton Reuse Indirect Option identified LSE on the Lee Valley SPA and Ramsar site and Wormley Hoddesdonpark Woods SAC due to potential hydrological connection and risk of pollutions events during construction and HRA Stage 2 AA was therefore undertaken. The AA identified no adverse effects on the integrity of the sites where appropriate mitigation is implemented. The HRA would be reviewed as the design develops and a full assessment undertaken pursuant to the consenting process. Please refer to Technical Supporting Document B2, Habitats Regulations Assessment.

Moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were also identified for the construction phase for the SEA objective on soil given the potential for disturbance and permanent loss of agricultural land (Grade 3) and there is potential for the options to disturb contaminants given they intersect or are within close proximity to historic and authorised landfill sites. The construction phase also has the potential to cause disruption to built assets and infrastructure therefore moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified. The options pass through Air Quality Management Areas (AQMAs) therefore moderate negative effects (pre-mitigation) ad minor negative effect (post mitigation) were identified for the SEA objective on air quality at the construction phase. Given both options pass through community or recreational facilities, moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified for both objectives related to population and human health. For the historic environment objective, moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified for the Lower Thames Reservoir Option given there is a Grade II listed building within the indicative location of the new water treatment works (WTW). For the SEA objective on flood risk, the Beckton Reuse Indirect Option is identified to have moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) for both the construction and operational phases given the locations of elements of the Option within Flood Zone 2 and 3. The Lower Thames Reuse Option is identified to have moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) as a result of potential construction related flood risk as it passes through Flood Zones 2 and 3. Minor negative or neutral effects were identified for the remaining SEA objectives.

Mitigation measures to prevent, reduce or off-set adverse environmental effects have been identified as part of the SEA. These measures do not always completely eliminate effects or result in the downgrading of effects, from moderate to minor for example, however they do contribute to reducing the effects identified for the SEA objective. It should be noted that these mitigation measures are indicative at this stage and would be confirmed as the design develops at subsequent project stages; any residual effects are therefore also indicative at this stage.

The cumulative assessment has considered the potential cumulative effects of the Lower Thames Reservoir and Beckton Reuse Indirect Options with other plans, programmes and projects. Both the Lower Thames Reservoir Option and Beckton Reuse Indirect Option have the potential to have cumulative effects with other plans, programmes and projects on receptors during the construction phase. No operational effects are anticipated. The HRA AA conducted for both options identified no adverse effects on the integrity of European Sites, with no residual effects expected. Therefore, no cumulative effects are anticipated.

1. Introduction

1.1 Purpose and structure of this report

1.1. This report presents the findings of a Strategic Environmental Assessment (SEA) applied to the two preferred options for the Thames to Affinity Transfer (T2AT) Strategic Resource Option (SRO).

1.2. It should be noted that the T2AT SEA is not a formal SEA under The Environmental Assessment of Plans and Programmes Regulations 2004 as it is a project not a plan/programme and is therefore, outside the scope of the SEA Regulations[2]. The SEA has been carried out as best practice and to help inform the Water Resources South East (WRSE) Regional Plan and the Thames and Affinity Water WRMP24s (Water Resource Management Plan 2024) SEAs. This report is therefore not an Environmental Report under the Regulations and therefore, does not contain all of the information as set out in Schedule 2. A compliant Environmental Report will be produced for the WRMP24s.

1.3. The report is structure as follows:

- Introduction – introduces the T2AT options, methodology, assumptions and limitations
- SEA for Lower Thames Reservoir Option – assessment outputs, key benefits and impacts of the Lower Thames Reservoir Option
- SEA for Beckton Reuse Indirect Option – assessment outputs, key benefits and impacts of the Beckton Reuse Indirect Option
- Mitigation – recommended mitigation measures to prevent, reduce or off-set adverse environmental effects
- Cumulative assessment – outputs of the cumulative assessment of the Lower Thames Reservoir and Beckton Reuse Indirect Options with other plans, programmes, and projects
- Summary and next steps – summary of the SEA and recommendations for the next steps to take the SRO forward at subsequent project stages
- Appendix A – Figures
- Appendix B – SEA matrices
- Appendix C – Lower Thames Reservoir Option cumulative assessment
- Appendix D – Beckton Reuse Indirect Option cumulative assessment

[2] UK Government (2004). The Environmental Assessment of Plans and Programmes Regulations 2004. Available at: https://www.legislation.gov.uk/uksi/2004/1633/contents/made [last accessed October 2022]

1.2 T2AT SRO options appraisal

1.4. Technical Supporting Document A4, Options Appraisal Methodology Report provides a description of the options identification, appraisal and screening process that has been undertaken to identify the preferred options for the T2AT SRO.

1.5. An unconstrainted list of 33 options was compiled in consultation with Affinity Water and Thames Water and screened against a set of initial screening criteria, which included consideration of impacts on statutory designated sites. Options which passed the initial screening stage were then screened against secondary screening criteria, which included consideration of environmental designations and features, impact on natural capital stocks, impact on Water Framework Directive no-deterioration objectives and impact on European Sites[3]. Consideration was also given to whether the option offered opportunities for biodiversity improvement and/or chalk stream enhancement, and whether any of the potential environmental impacts identified could be mitigated, and the level of mitigation that would be required.

1.6. Eight options remaining after screening:

- Maidenhead: abstraction of raw water at a new Maidenhead intake, conveyance to a new WTW at an existing service reservoir, and utilisation of available storage capacity at the existing service reservoir in the vicinity of Harefield.
- Sunnymeads 1: Abstraction of raw water at the existing Affinity Water Sunnymeads intake, conveyance to a new WTW at an existing Harefield service reservoir site in the vicinity of Harefield, and utilisation of the available storage capacity at the existing service reservoir.
- Teddington Direct River Abstraction (DRA): Abstraction of raw water at a new intake at Teddington, upstream of Teddington weir and upstream of the proposed London Effluent Reuse SRO Teddington DRA option outfall (treated effluent from Mogden STW); conveyance to a new WTW in the vicinity of Harefield; and utilisation of the available storage capacity at the existing service reservoir in the vicinity of Harefield.
- Sunnymeads 2a: Abstraction of raw water at the existing Affinity Water Sunnymeads intake and conveyance to a new WTW at Iver (Iver 2), near to the existing Iver WTW. The drinking water is then conveyed to an existing service reservoir in the vicinity of Harefield to utilise the available storage capacity at the existing service reservoir.
- Walton 2b: Abstraction of raw water via an extension to the existing Affinity Water Walton intake and conveyance to the proposed Iver 2 WTW. The drinking

[3] This includes Special Protection Areas (SPAs) and Special Areas of Conservation (SACs), proposed and candidate SPAs and SACs (pSPAs and cSACs). The network also extends to wetland sites of international importance (Ramsar sites).

water is then conveyed to an existing service reservoir in the vicinity of Harefield to utilise the available storage capacity at the existing service reservoir.

- Mogden Reuse Indirect 3: This option comprises the same infrastructure as Walton 2b but utilises water from the proposed London Effluent Reuse SRO Mogden effluent reuse option. For the Mogden Reuse Indirect 3 option in T2AT, an extension of the London Effluent Reuse SRO Mogden effluent reuse option outfall pipeline is required from the reach containing the Thames Water Walton intake, to the reach containing the Affinity Water Walton intake i.e. to a point upstream of Sunbury weirs.
- Lower Thames Reservoir 2a: Water from Thames Water's Wraysbury and Queen Mother reservoirs is abstracted via a proposed connection into Affinity Water's existing Wraysbury (100" inch) tunnel at the existing Iver WTW site. This raw water is then diverted to the proposed Iver 2 WTW. The drinking water is subsequently conveyed to an existing service reservoir in the vicinity of Harefield to utilise the available storage capacity at the existing service reservoir.
- Beckton Reuse Indirect: Indirect transfer of recycled water from Beckton STW to a new WTW and new service reservoir near North Mymms. The proposed abstraction point would be located on the River Lee, downstream of the outfall from the proposed Beckton effluent reuse option (including extension from Lockwood shaft), within the London Effluent Reuse SRO. Another potential source for this option is water abstracted as part of the London Effluent Reuse SRO Teddington DRA option, which abstracts river water upstream of the recycled water discharge from Mogden STW and utilises the existing Thames-Lee Tunnel (with an extension), which would discharge in a similar location to the proposed Beckton Water Recycling option (London Effluent Reuse SRO). N.B. In the period since option selection, modelling by both WRSE and Affinity Water has identified a constraint in the distribution network between the proposed import point at North Mymms and an existing service reservoir in the vicinity of Brookmans Park in WRZ3. This option has therefore been extended to include a drinking water conveyance component from North Mymms to Brookmans Park. Furthermore, since Gate 1, the Beckton Reuse Indirect option has been extended to feed an existing service reservoir in the vicinity of Brookmans Park due to the limited existing transfer capacity from North Mymms to Brookmans Park.

1.7. The eight options were assessed by WRSE in January 2021, in-line with the methodology in the WRSE guidance[4]:

- Habitats Regulations Assessment (HRA) Stage 1: Test of Likely Significance (Screening Assessment)
- WFD Assessment Level 1: Basic Screening
- SEA

[4] Mott MacDonald (2020) Water Resources South East (WRSE) Regional Plan Environmental Assessment Methodology Guidance. Available at: https://www.wrse.org.uk/media/lb0g0tsr/wrse_file_1347_wrse-regional-plan-environmental-assessment-methodology-guidance.pdf [last accessed October 2022]

- Natural Capital Assessment and Biodiversity Net Gain

1.8. Environmental assessments carried out prior to the Gate 1 submission, which followed further refinement of infrastructure siting and pipeline route optimisation included:

- Updated Stage 1 HRA and Stage 2 Appropriate Assessment, if required, in accordance with the WRSE guidance.
- Updated Level 1 WFD Basic Screening and Level 2 Detailed Impact Screening, if required, in accordance with the WRSE guidance.
- Consideration of local level data (Local Wildlife Sites (LWS) and Tree Preservation Orders (TPO)) in-line with the methodology in the ACWG guidance[5].
- Review of SEA against refined options to confirm any changes to the WRSE metrics.
- Invasive non-native species (INNS) risk assessment.
- Assessment of opportunities for net zero carbon contributions.
- Consideration of wider benefits including societal benefits and environmental net gain.

1.9. Technical Supporting Document A4, Options Appraisal Methodology Report provides a comparison of the eight options taken forward against the following themes: technical challenge, carbon footprint, environment and community, and planning complexity.

1.10. Maidenhead, Teddington DRA and Walton 2b / Mogden Reuse Indirect 3 did not perform as well under the environment and community theme due to WFD risks and, in the case of Teddington DRA and Walton 2b / Mogden Reuse Indirect 3, higher loss of ecosystem services and biodiversity than other options, potentially due to the length of pipeline, which was longer than other options, also resulting in higher carbon emissions. Maidenhead also performed poorly due to proximity of the Chilterns Area of Outstanding Natural Beauty (AONB) to construction work and the pipeline intersecting with two historic parks and gardens.

1.11. The Lower Thames Reservoir Option compared well under all the themes considered within the options appraisal, including environment and community, and hence would be a favourable option for development to Gate 2. The Beckton Reuse Indirect Option also compared well to the other transfer options, and in particular the other two options which rely on reuse water. This is the most favourable reuse option for development to Gate 2 and is the only T2AT option which feeds directly into the eastern side of Affinity Water's Supply area.

1.12. Which, if any, of the T2AT options are carried past Gate 2 will be determined by the further outputs of the WRSE regional modelling, the best value plan which it informs, and the outcomes of the resultant public consultation processes on the emerging

[5] WRMP Environmental Assessment Guidance and Applicability with SROs – ACWG – October 2020.

and draft plans. The process will consider and compare the merits of whole solutions, of which the transfer scheme would be just one component in a system which ensures continuity of supply to customers. Of particular relevance is the choice of option (or other SRO) to provide the source of new raw water for the T2AT scheme, whether linked to additional effluent reuse, new raw water storage or an inter-regional transfer. The optimisation of the whole system relies on the WRSE best value planning and modelling process, but the choice will also be informed by the relative merits of the different options. The model also considers consequential benefits such as reductions in groundwater abstraction and additional water discharges into the environment. The assessments of the T2AT options are therefore to be considered within the larger context of the overall solutions which constitute the best value plan.

1.13. The preferred options for the T2AT SRO are the Lower Thames Reservoir Option and the Beckton Reuse Indirect Option (hereafter referred to as the 'T2AT SRO Options').

1.14. Technical Supporting Document A5, Options Refinement Report provides a description of how the preferred T2AT SRO Options have been developed since Gate 1, including the options appraisal process that has been undertaken to select indicative route corridors and sites for above ground infrastructure. The routes and sites were developed based on series of criteria that consider engineering, environmental, social, and planning constraints. The route for each option has been identified within a wider corridor that meets a majority of the criteria and therefore avoids a large number of environmental designations and communities. This report presents the assessment of the indicative route corridors and indicative sites for above ground infrastructure for the purpose of the Gate 2 submission. Those alternatives discounted through the options appraisal process are not considered within this SEA; Technical Supporting Document A5, Options Refinement Report should be referred to for further information on these alternatives and the reasons for discounting them at this stage. It should be noted that the indicative route corridors and sites for above ground infrastructure, along with the alternatives considered, would be subject to stakeholder engagement and a public consultation exercise.

1.3 Description of T2AT SRO Options

1.15. The preferred T2AT SRO Options are summarised below. Further detail is provided in Technical Supporting Document A1a, Concept Design Report (Lower Thames Reservoir Option) and Technical Supporting Document A1a, Concept Design Report (Beckton Reuse Indirect Option).

- Lower Thames Reservoir Option: Abstraction of raw water from Thames Water's Wraysbury and Queen Mother reservoirs via a proposed connection into Affinity Water's existing Wraysbury (100") tunnel at the existing Iver Water Treatment Works (WTW). This raw water would then be diverted to a new WTW to the north

of the existing Iver WTW. The treated water would then be subsequently conveyed via a drinking water transfer pipeline to utilise the available storage capacity at an existing service reservoir in the vicinity of Harefield.

- Beckton Reuse Indirect Option: An intake on the River Lee flood relief channel and raw water pumping station with a raw water transfer pipeline to a new WTW (location to be determined). The treated water would then be transferred via a drinking water transfer pipeline from the new WTW to an existing service reservoir in the vicinity of Brookmans Park. A drinking water pipeline would then transfer the water from this service reservoir to a booster pumping station in the vicinity of North Mymms.

1.16. Two alternative capacities have been considered for the T2AT SRO Options, which are sized to provide an increase of 50Ml/d and 100Ml/d of average deployable output to Affinity Water respectively.

1.17. The key components of the Lower Thames Reservoir Option are summarised below and shown on Figure 2.1: Lower Thames Reservoir Option – key components.

- A connection into the existing Wraysbury tunnel at the existing Iver WTW, and raw water pumping station (within this report referred to as the 'Wraysbury Tunnel Connection').
- A raw water transfer pipeline from the existing Iver WTW to a new WTW (within this report referred to as the 'LTR Raw Water Transfer Main'). The indicative route corridor identified for the LTR Raw Water Transfer Main is referred to as the 'LTR Raw Water Transfer Main Route Corridor'.
- A new WTW (within this report referred to as the 'new LTR WTW') to the north of the existing Iver WTW (within this report referred to as the ' LTR Indicative WTW Site').
- A drinking water transfer pipeline from the new LTR WTW to an existing service reservoir in the vicinity of Harefield (within this report referred to as the 'LTR Drinking Water Transfer Main'). The indicative route corridor identified for the LTR Drinking Water Transfer Main is referred to as the 'LTR Drinking Water Transfer Main Route Corridor'.
- A connection into an existing service reservoir in the vicinity of Harefield (within this report referred to as the 'Harefield Service Reservoir Connection').

1.18. The key components of the Beckton Reuse Indirect Option are summarised below and shown on Figure 2.2: Beckton Reuse Indirect Option – key components.

- An intake and raw water pumping station (within this report referred to as 'River Lee Intake' and 'Raw Water Pumping Station'). The indicative location identified for the River Lee Intake is referred to as 'Indicative Intake Location' and the indicative site identified for the Raw Water Pumping Station is referred to as the 'Indicative Raw Water Pumping Station Site.'

- A raw water transfer pipeline to a new WTW (within this report referred to as 'BRI Raw Water Transfer Main'). The indicative route corridor identified for the Raw Water Transfer Main is referred to as the 'Raw Water Transfer Main Route Corridor'.
- A new WTW (within this report referred to as the 'new BRI WTW') to the north of the River Lee Intake (within this report referred to as the 'Indicative BRI WTW Site').
- A drinking water transfer pipeline from the new WTW to an existing reservoir within the vicinity of Brookmans Park (within this report referred to as the 'BRI Drinking Water Transfer Main'). The indicative route corridor identified for the Drinking Water Transfer Main is referred to as the 'Drinking Water Transfer Main Route Corridor'.
- A connection to an existing reservoir within the vicinity of Brookmans Park (within this report referred to as the 'Brookmans Park Service Reservoir Connection').
- A drinking water transfer pipeline from the Brookmans Park Service Reservoir Connection to a booster pumping station in the vicinity of North Mymms (within this report referred to as the 'Drinking Water Transfer Main to North Mymms'). The indicative route corridor identified for the Drinking Water Transfer Main to North Mymms is referred to as the 'Drinking Water Transfer Main to North Mymms Route Corridor'.
- A connection to an existing booster pumping station in the vicinity of North Mymms (within this report referred to as the 'North Mymms Booster Station Connection').

1.4 Methodology

1.19. This document presents the SEA of the T2AT SRO Options.

1.20. The SEA has been undertaken in-line with the environmental assessment methodology developed as part of the WRSE regional plan process as presented in the WRSE SEA Scoping Report (Mott MacDonald, 2020[6]) and Environmental Assessment Methodology Guidance (Revision D[7]). The T2AT options were initially assessed as part of the environmental assessment of the WRSE regional plan and have also been assessed as part of the Gate 1 process. However, following Gate 1, the options have been developed further and the SEA has therefore been updated to reflect the most up to date options.

[6] WRSE (2020) WRSE Regional Plan SEA Scoping Report. Available at: https://www.wrse.org.uk/media/51vdwyw0/wrse-regional-plan-strategic-environmental-assessment-scoping-report.pdf [last accessed October 2022]

[7] WRSE (2021) Method Statement: Environmental Assessment. Post-consultation version. November 2021. Available at: https://www.wrse.org.uk/media/qmtb1e5v/method-statement-environmental-assessment-nov-2021.pdf [last accessed October 2022]

1.21. The SEA has been carried out using the SEA Framework which sets out each of the SEA objectives as presented in Table 1.1. Each SEA objective has defined datasets and a defined scoring system using a qualitative scale of minor, moderate, major positive and minor, moderate, major negative, and neutral as summarised in Table 1.2. The effect of each option was assessed using this scale and a narrative justification provided.

1.22. The EARs, the Habitat Regulations Assessments (HRA), invasive and non-native Species (INNS) and Water Framework Directive (WFD) assessments have also informed the SEA. These can be found in Technical Supporting Document B1a, Environmental Appraisal Report (Lower Thames Reservoir Option), Technical Supporting Document B1b, Environmental Appraisal Report (Beckton Reuse Indirect Option), Technical Supporting Document B2, Habitats Regulations Assessment, and Technical Support Document B3, Water Framework Directive respectively. Natural capital and biodiversity net gain (BNG) assessments have also been undertaken, as outlined within the EARs. However, the results are not considered within the SEA and therefore do not contribute to the scoring at this stage as it is currently unclear whether they would be taken forward and further investigation to develop these opportunities would be required at subsequent project stages.

1.23. A cumulative assessment with other water company capital investments or third-party development plans or projects has been undertaken and is presented in Chapter 5, Cumulative assessment.

1.24. In all cases, the findings presented in this document follow the methodologies above and the principles of SEA. The scoring criteria for each SEA objective are presented in Appendix B.

Table 1.1: SEA objectives

SEA topic	SEA objective
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)
Soil	Protect and enhance the functionality, quantity and quality of soils
Water	Increase resilience and reduce flood risk
	Protect and enhance the quality of the water environment and water resources
	Deliver reliable and resilient water supplies
Air	Reduce and minimise air emissions
Climatic factors	Reduce embodied and operational carbon emissions

SEA topic	SEA objective
	Reduce vulnerability to climate change risks and hazards
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity
Historic environment	Conserve, protect and enhance the historic environment, including archaeology
Population and human health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
	Maintain and enhance tourism and recreation
Material assets	Minimise resource use and waste production
	Avoid negative effects on built assets and infrastructure

Table 1.2: Scoring key

Effect	Description
+++	Major Positive
++	Moderate Positive
+	Minor Positive
0	Neutral
-	Minor Negative
--	Moderate Negative
---	Major Negative
?	Uncertain

1.5 Assumptions and limitations

1.25. The SEA is based upon published data and information provided by Thames Water and Affinity Water, and from third party organisations. The baseline information on the GIS database used to identify potential effects in this SEA is the most up-to-date information currently available at the time of writing, however it is possible that conditions described in this report may change over time. The GIS database is an ESRI tool that uses open-source datasets from Natural England, the Environment Agency, Historic England and other sources. The full list of environmental data layers used is presented in Table 1.3.

Table 1.3: Summary of SEA environmental data layers

SEA topic	Environmental data layer
Biodiversity, flora and fauna	SPA SAC Ramsar site Site of Special Scientific Interest (SSSI) Marine Protection Area (MPA) Marine Conservation Zone (MCZ) National Nature Reserve (NNR) Local Nature Reserve (LNR) Priority habitats and species Non-designated sites Terrestrial, aquatic and marine habitats, species and protected sites Green networks and corridors
Soil	Agricultural Land Classification Landfill sites – authorised and historic
Water	Environment Agency Flood Defences Environment Agency Main Rivers Flood Zones 2 and 3 Surface Water Features WFD River Waterbody Catchments WFD River Waterbodies Cycle 2 Bathing Waters (for desal options) Shellfish Waters (desal options) Source Protection Zones WFD Groundwater bodies
Air	Air Quality Management Zones Air quality monitoring sites

SEA topic	Environmental data layer
Climatic factors	Option carbon data UK Climate Projections 2018 climate data (UKCP18) Sea level rise projections
Landscape	Areas of Outstanding Natural Beauty National Character Areas Green Belt land National Park
Historic environment	Listed buildings: - Grade I listed structures - Grade II* listed structures - Grade II listed structures Registered Parks and Gardens: - Grade I Registered Parks and Gardens - Grade II* Registered Parks and Gardens - Grade II Registered Parks and Gardens Protected Wrecks Registered Battlefields Scheduled Monuments Conservation Areas World Heritage Sites
Population and human health	Noise action important area Indices of Multiple Deprivation (IMD) 2015 Functional site: - Schools - Medical facilities OS Greenspace dataset: - Allotments - Bowling green - Cemetery - Golf course - Sports facility - Play space - Playing field - Public park or garden

SEA topic	Environmental data layer
	- Religious grounds - Tennis courts Natural England – Country Parks National Parks Section 15 open access areas Countryside and Rights of Way Act 2000 S4 Conclusive Registered Common Land
Material assets	Transport: - Major roads – A roads - Major roads motorway - Railway line - National cycle route - National trails

1.26. The SEA has also used information collated as part of the EARs to provide additional site-specific and local level information. However, this information was undertaken as a desk-based assessment only. The EARs are structured by SEA topic with desk-based assessments undertaken for each, the results of which have informed the SEA, excluding the desk-based assessment on climate risk. The desk-based assessment on climate risk is the only one which has not informed the SEA given it is related to the impact of climate change on the option whereas the objective relates to the impact the option would have on the local environment's resilience to climate change.

1.27. The SEA has not identified any specific site surveys or investigations that are required beyond those identified in the EARs. However, site surveys and investigations would be scoped at the next stage and undertaken to provide more detailed baseline information in order to better determine effects and mitigation measures required. A list of recommended further technical work is provided in Chapter 18 (Summary of main findings and recommendations for future technical work) of Technical Supporting Document B1a, Environmental Appraisal Report (Lower Thames Reservoir Option) and Technical Supporting Document B1b, Environmental Appraisal Report (Beckton Reuse Indirect Option).

1.28. The mitigation measures identified as part of the SEA (Chapter 4, Mitigation) are indicative at this stage given the current stage of the option development. It is recommended that these are taken forward, however these would be confirmed as the design develops at subsequent project stages.

2. SEA for the Lower Thames Reservoir Option

2.1 Assessment

2.1. This section summarises the SEA outputs for the Lower Thames Reservoir Option.

2.2. Table 2.1 presents the scores for the construction and operational phases against each of the SEA objectives, split into positive and negative effects as outlined in the methodology.

2.3. The scores are presented for pre-mitigation (before any mitigation is applied) and the post-mitigation (after mitigation is applied, 'residual effects'). The recommended mitigation for each SEA objective is described in Chapter 4, Mitigation. It should be noted that mitigation measures are indicative at this stage and would be confirmed as the design develops at subsequent project stages; any residual effects are therefore also indicative at this stage.

2.4. The narrative related to the scores, identifying the key benefits and impacts of the option, is presented in Section 2.2, with the full assessment matrix presented in Appendix B.

Table 2.1: Summary of SEA for Lower Thames Reservoir Option

SEA topic	SEA objective	Pre-mitigation				Post mitigation			
		Construction		Operation		Construction		Operation	
		+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	--	+	-	0	-	+	-
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	0	-	0	0

SEA topic	SEA objective	Pre-mitigation				Post mitigation			
		Construction		Operation		Construction		Operation	
Water	Increase resilience and reduce flood risk	0	--	0	-	0	-	0	0
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	++ +	0	0	0	++ +	0
Air	Reduce and minimise air emissions	0	--	0	0	0	-	0	0
Climatic factors	Reduce embodied and operational carbon emissions	0	-	0	--	0	-	0	--
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	-
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	0
Historic environment	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	0	-	0	0

SEA topic	SEA objective	Pre-mitigation				Post mitigation			
		Construction		Operation		Construction		Operation	
Population and human health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	0	0	-	0	0
	Maintain and enhance tourism and recreation	0	--	0	-	0	-	0	-
Material assets	Minimise resource use and waste production	0	-	0	0	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0

2.5. It should be noted that the assessment results between Gate 1 and Gate 2 have changed, however this is predominately as a result of the option design being reviewed and refined. The assessment undertaken at Gate 1 also split out the SEA into three elements (pipeline, WTW and conveyance) whereas the SEA at Gate 2 assesses the Lower Thames Reservoir Option as a whole.

2.2 Key benefits and impacts

2.6. A narrative summary related to the scores presented above, outlining the key benefits and adverse effects identified for the Lower Thames Reservoir Option, is included in Table 2.2. The full assessment presented in Appendix B. It should be noted that the EARs and the other assessments, such as the natural capital and BNG assessments, set out opportunities and wider benefits in addition to those in Table 2.2. They have not been included in the SEA as it is currently unclear whether they would be taken forward and further investigation to develop these opportunities would be required at subsequent project stages.

Table 2.2: Summary of the benefits and adverse effects of the Lower Thames Reservoir Option

SEA topic	SEA objective	Benefit	Adverse
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	There could be positive effects on aquatic ecology (at different times for different species).	There are SSSIs, Groundwater Dependent Terrestrial Ecosystems (GWDTE) and LNRs within 500m of the option, and sites within 2000m, and there is potential for disturbance to these during the construction phase. The option passes through priority habitat and woodland therefore potential direct effects during construction. Moderate negative effects are identified for the construction phase pre-mitigation and minor effects are identified post-mitigation for the construction phase. There is potential for operational effects on aquatic ecology due to changes in flows and water quality. There is also potential for effects on protected species. Operational effects are identified for surrounding habitats. The risk for the transfer / spread of INNS is anticipated to be low given the raw water would be treated at the new WTW before storage within the closed service reservoir. However, any leaks of raw water prior to treatment could affect surrounding habitat. Minor negative effects are identified for the operational phase pre-mitigation and post-mitigation. The HRA Stage 1 Test of Likely Significance (ToLS) identified potential Likely Significant Effects (LSE) on the South West London Waterbodies SPA and Ramsar therefore HRA Stage 2 Appropriate Assessment (AA) was undertaken. The AA identified no adverse effects on the integrity the sites where appropriate mitigation is implemented.

SEA topic	SEA objective	Benefit	Adverse
Soil	Protect and enhance the functionality, quantity and quality of soils	None identified.	There is potential for disturbance to Grade 2, 3 and Grade 4 agricultural land during the construction phase and land take is required[8]. The option passes through historic landfill sites and there are additional sites within proximity therefore potential for construction phase to disturb contaminants. Moderate negative effects are identified pre-mitigation and minor negative effects are identified post-mitigation. Neutral effects are identified for the operational phase.
Water	Increase resilience and reduce flood risk	None identified.	Low risk of fluvial flooding given most of the pipeline route is within Flood Zone 1, however it does pass through Flood Zone 2 and 3 therefore potential risk during construction. The indicative location of the new pumping station and new WTW is within Flood Zone 1, however a small proportion of the WTW site has a high surface water flood risk and therefore potential for construction and operational risks. Operational risks are not anticipated for the pipeline given it would be buried. Moderate negative effects are identified for the construction phase pre-mitigation and minor negative effects post-mitigation as the risk is likely to remain. For the operational phase, minor negative effects are identified pre-mitigation, however neutral effects are identified post-mitigation.

[8] Note that the provisional Agricultural Land Classification (ALC) data does not subdivide Grade 3 into 3a (representing best and most versatile land) and 3b (not presenting best and most versatile land). Where detailed ALC survey is available, some areas of the Drinking Water Transfer Main Route Corridor have been classified as Grade 2 and 3a (in the New Denham area between the M25 and M40) and 4 (in the southern section of the route corridor immediately east of the M25). Grade 2 and 3a represent best and most versatile agricultural land which should be protected.

SEA topic	SEA objective	Benefit	Adverse
	Protect and enhance the quality of the water environment and water resources	None identified.	The construction phase has the potential to lead to the contamination of the water environment. The WFD Level 2 (2022) assessment identified that the option is WFD compliant. Further hydrological assessment is required for works within Source Protection Zone (SPZ) 1 or 2. Minor negative effects are identified both pre- and post-mitigation for the construction phase.
	Deliver reliable and resilient water supplies	The option would improve water transfer across regions, improving water resource management and resilience of supply.	None identified.
Air	Reduce and minimise air emissions	None identified.	The option passes through AQMAs and there is potential for the construction phase to lead to effects on local air quality. The annual mean nitrogen dioxide (NO_2) objective may be exceeded in regions of the option that are located close to the roadside within South Bucks District Council AQMA No. 2 AMQA. Exceedances of the NO_2 objectives are unlikely to occur in suburban and urban background locations, where the majority of the option is located. Exceedances of the particulate matter (PM_{10} and $PM_{2.5}$) objectives are not expected to occur in any location. Moderate negative effects are therefore identified for the construction phase pre-mitigation, and following mitigation, minor negative effects are identified.

SEA topic	SEA objective	Benefit	Adverse
Climatic factors	Reduce embodied and operational carbon emissions	None identified.	Carbon would be generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation such as the WTW or pumping stations, as well as changes to carbon sequestration as a result of permanent and temporary land use change. Minor negative effects are identified pre- and post-mitigation for the construction phase. Moderate negative effects are identified for the operational phase pre- and post-mitigation.
	Reduce vulnerability to climate change risks and hazards	None identified.	The option has the potential to affect the resilience of the local environment to climate change as it involves abstracting water. Neutral effects are identified for the construction phase and minor negative effects are identified for the operational phase pre- and post-mitigation.
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified.	The option is within the London Area Greenbelt and Thames Valley National Character Area (NCA). There is potential for minor effects on landscape during the construction phase. The Indicative WTW Site has the potential to result in visual effects, however given it is to be located on an existing industrial site, effects are considered negligible. Minor negative effects are identified for the construction phase pre- and post-mitigation and neutral effects are identified for the operational phase.

SEA topic	SEA objective	Benefit	Adverse
Historic environment	Conserve, protect and enhance the historic environment, including archaeology	None identified.	A Grade II Listed Building (Iver Court Farmhouse) is located within the LTR Indicative WTW Site and, depending on the layout for this site, the construction phase has the potential to directly impact the asset through loss of fabric. Operational effects are not anticipated for this asset given it is already surrounded by industrial uses. There are listed buildings, a scheduled monument and conservation areas within 500m of the option route and there are additional historic assets within 2km. There is potential for the setting of these assets to be affected during the construction phase. The excavation required for the option could impact archaeology, if present. Moderate negative effects are identified pre- mitigation and minor negative effects are identified post-mitigation. Neutral effects are identified for the operational phase.
Population and human health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified.	The option passes through a golf course, noise action planning important areas and is also within 500m of community facilities. There is potential for the construction phase to lead to disturbance effects for the local community and users of these facilities, such as noise related effects. IMD deciles range from 4 to 9 along the option. Moderate negative effects are identified pre-mitigation and minor negative effects are identified post-mitigation. Neutral effects are identified for the operational phase.
	Maintain and enhance tourism and recreation	None identified.	The option passes through a golf course and is within 500m of other recreational facilities. It also intersects national cycle routes and has the potential to lead to disruption for public rights of way during

SEA topic	SEA objective	Benefit	Adverse
			the construction phase. As such, there may be temporary effects from a change in amenity. Depending on the design of the WTW, there may be a change in environmental conditions during operation for open spaces and recreation surrounding the proposed locations as a result of a combination of noise, air quality, visual impacts or presence of HGV vehicles. Moderate negative effects are identified pre-mitigation and minor negative effects are identified post-mitigation. Minor negative effects are identified for the operational phase pre and post mitigation.
Material assets	Minimise resource use and waste production	None identified.	New infrastructure required for this option would use materials and generate waste, including excavated material. Minor negative effects are identified for the construction phase pre- and post-mitigation. Neutral effects are identified for the operational phase.
	Avoid negative effects on built assets and infrastructure	None identified.	The option cross major roads, High Speed 2 railway, the Grand Union Canal and national cycle routes. There is potential for disruption to these assets during the construction phase. Additional constraints are not anticipated for the road network because of construction traffic. There is potential for damage to other material assets, including power lines, during the construction phase. Moderate negative effects are identified for the construction phase pre- and post-mitigation. Neutral effects are identified for the operational phase.

3. SEA for the Beckton Reuse Indirect Option

3.1 Assessment

3.1. This section summarises the SEA outputs for the Beckton Reuse Indirect Option.

3.2. Table 3.1 presents the scores for the construction and operational phases against each of the SEA objectives split into positive and negative effects as outlined in the methodology. The scores are presented for pre-mitigation (before any mitigation is applied) and post-mitigation (after mitigation is applied, 'residual effects'). The recommended mitigation for each SEA objective is described in Chapter 4, Mitigation. It should be noted that mitigation measures are indicative at this stage and would be confirmed as the design develops at subsequent project stages; any residual effects are therefore only indicative at this stage.

3.3. The narrative related to the scores, outlining the key benefits and impacts of the option, is presented in Section 3.2, with the full assessment matrix presented in Appendix B.

Table 3.1: Summary of SEA for Beckton Reuse Indirect Option

SEA topic	SEA objective	Pre-mitigation				Post mitigation			
		Construction		Operation		Construction		Operation	
		+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	-	0	--	0	-
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	0	-	0	0

SEA topic	SEA objective	Pre-mitigation				Post mitigation			
		Construction		Operation		Construction		Operation	
Water	Increase resilience and reduce flood risk	0	--	0	--	0	-	0	-
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	0	0	+++	0
Air	Reduce and minimise air emissions	0	--	0	0	0	-	0	0
Climatic factors	Reduce embodied and operational carbon emissions	0	-	0	--	0	-	0	--
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	0	0	0	-
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	0	-	0	0
Historic environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	-	0	-	0	-

SEA topic	SEA objective	Pre-mitigation				Post mitigation			
		Construction		Operation		Construction		Operation	
Population and human health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	-	0	-	0	-
	Maintain and enhance tourism and recreation	0	--	0	0	0	-	0	0
Material assets	Minimise resource use and waste production	0	-	0	0	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0

3.4. It should be noted that the assessment results between Gate 1 and Gate 2 have changed, however this is predominately as a result of the option design being reviewed and refined. The assessment undertaken at Gate 1 also split out the SEA into two elements (pipeline and WTW) whereas the SEA at Gate 2 assesses the Beckton Reuse Indirect Option as a whole.

3.2 Key benefits and impacts

3.5. A narrative summary related to the scores presented above, outlining the key benefits and adverse effects identified for the Beckton Reuse Indirect Option is included in Table 3.2. The full assessment presented in Appendix B. It should be noted that the EAR and the other assessments, such as the natural capital and biodiversity net gain assessment, identify and set out opportunities and wider benefits in addition to those in Table 3.2. They have not been included in the SEA as

it is currently unclear whether they would be taken forward and further investigation to develop these opportunities would be required at subsequent project stages.

Table 3.2: Summary of the benefits and adverse effects of the Beckton Reuse Indirect Option

SEA topic	SEA objective	Benefit	Adverse
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	None identified.	The indicative intake on the River Lee is within the Chingford Reservoirs SSSI therefore potential for direct effects during the construction. The construction phase of the Drinking Water Transfer Main Route Corridor has the potential to indirectly affect Wormley-Hoddesdonpark Wood South SSSI and SAC; Northaw Great Wood SSSI and Northaw Great Wood Country Park LNR. Water End Swallow Holes SSSI has the potential to be affected by the Drinking Water Transfer Main to North Mymms Route Corridor during construction. There is an additional LNR within 500m of the option and additional SSSIs, GWDTEs, a SAC, an SPA and Ramsar and LNR within 2000m. There is potential for indirect effects from the construction phase on these sites. The option passes through woodland and priority habitat therefore potential for direct effects and there is also potential for effects on areas of ancient woodland. There is also potential for effects on protected species. The construction phase has the potential to impact aquatic ecology, however these are identified to be short term and reversible. Major negative effects are identified pre-mitigation for the construction phase and following mitigation, moderate negative effects are identified. Operational effects are identified for surrounding habitats. The risk for the transfer / spread of INNS is anticipated to be low given the raw water abstracted from the River Lee would be treated at the

SEA topic	SEA objective	Benefit	Adverse
			new BRI WTW before being stored at a service reservoir in the vicinity of Brookmans Park. Backflushing or 'airburst' may be required for maintenance of the intake, which could result in localised impacts on water quality through the re-suspension of fine material and water quality impacts. Minor negative effects were identified for the operational phase pre and post mitigation. The HRA Stage 1 ToLS identified the potential for LSE on the Lee Valley SPA and Ramsar site and Wormley Hoddesdonpark Woods SAC and Stage 2 AA was therefore undertaken. The HRA AA identified no adverse effects on the integrity of the sites where appropriate mitigation is implemented.
Soil	Protect and enhance the functionality, quantity and quality of soils	None identified.	There is potential for disturbance to Grade 3 agricultural land during the construction phase and land take required from Grade 3 for the indicative location of the new pumping station and new BRI WTW[9]. The option passes through historic landfill sites and there are additional sites within proximity therefore potential for construction phase to disturb contaminants. Moderate negative effects are identified pre-mitigation and minor negative effects post-mitigation for the construction phase. Neutral effects are identified for the operational phase.

[9] Note that the provisional ALC data does not subdivide Grade 3 into 3a (representing best and most versatile land) and 3b (not representing best and most versatile land). Grade 3a represents best and most versatile agricultural land, which should be protected.

SEA topic	SEA objective	Benefit	Adverse
Water	Increase resilience and reduce flood risk	None identified.	The option is predominately within Flood Zone 1, however there are areas of Flood Zone 2 and 3 which the option passes through. There is potential for the construction phase to be at risk of flooding. The indicative location of the new BRI WTW is identified to be within Flood Zone 1. The Indicative Intake Location, Indicative Raw Water Pumping Station Site and parts of the Drinking Water Transfer Main Route Corridor and Drinking Water Transfer Main to North Mymms Route Corridor are within Flood Zones 2 and 3 and therefore are at risk of flooding. The pipeline would be buried therefore operational risks not anticipated; however, the other assets may be at risk during the operational phase. Moderate negative effects are identified for both the construction and operational phases pre-mitigation and following mitigation, minor negative effects are identified for both.
	Protect and enhance the quality of the water environment and water resources	None identified.	The construction phase has the potential to lead to the contamination of the water environment. The WFD Level 2 (2022) assessment identified that the option is WFD compliant. Further hydrological assessment is required for works within SPZ1 or 2. Minor negative effects are identified for the construction phase pre- and post-mitigation. Neutral effects are identified for the operational phase.

SEA topic	SEA objective	Benefit	Adverse
	Deliver reliable and resilient water supplies	The option would improve water transfer across regions, improving water resource management and resilience of supply.	None identified.
Air	Reduce and minimise air emissions	None identified.	The option passes through the Enfield AQMA. Exceedances of NO_2. $PM_{2.5}$ and PM_{10} are not expected to occur. However, there may be some minor effects on local air quality during construction. Minor negative effects are identified pre- and post-mitigation for the construction phase and neutral effects are identified for the operational phase.
Climatic Factors	Reduce embodied and operational carbon emissions	None identified.	Carbon would be generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation such as the WTW or pumping stations, as well as changes to carbon sequestration as a result of permanent and temporary land use change. Minor negative effects are identified pre- and post-mitigation for the construction phase. Moderate negative effects are identified for the operational phase pre- and post-mitigation.

SEA topic	SEA objective	Benefit	Adverse
	Reduce vulnerability to climate change risks and hazards	None identified.	The option has the potential to affect the resilience of the local environment to climate change as it involves abstracting water. Neutral effects are identified for the construction phase and minor negative effects are identified for the operational phase pre and post mitigation.
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified.	The option is within the London Area Greenbelt and Northern Thames Basin NCA. There are likely to be minor effects on the landscape during the construction phase. The new WTW is indicatively located on a site which is partly developed and partly greenfield. As such, there may be permanent changes to the landscape. Minor negative effects are identified pre and post mitigation for the construction and operational phases.
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	None identified.	There are listed buildings, a registered park and garden and scheduled monuments within 500m of the option and there are additional assets within 2000m. The setting of these assets has the potential to be affected during the construction phase. The excavation required for the option could impact archaeology, if present. Minor negative effects are identified pre- and post-mitigation for the construction and operational phases.
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including	None identified.	The option passes through a country park and is within 500m of other community facilities. There is potential for disruption to the local community and users of these community facilities during the construction phase. IMD deciles range from 2 to 10 along the route. Moderate negative effects are identified pre-mitigation and minor

SEA topic	SEA objective	Benefit	Adverse
	economic and social wellbeing		negative effects post-mitigation for the construction phase. Minor negative effects are identified pre- and post-mitigation for the operational phase.
	Maintain and enhance tourism and recreation	None identified.	The option passes through a country park and is within 500m of other recreational facilities. The option also intersects national cycle routes and there is potential for disruption to public rights of way during the construction phase. Moderate negative effects are identified pre-mitigation and minor negative effects post-mitigation for the construction phase. Neutral effects are identified for the operational phase.
Material Assets	Minimise resource use and waste production	None identified.	New infrastructure required for this option would use materials and generate waste, including excavated material. Minor negative effects are identified for the construction phase pre- and post-mitigation. Neutral effects are identified for the operational phase.
	Avoid negative effects on built assets and infrastructure	None identified.	The option intersects major roads, railways and national cycle routes. There is potential for disruption to these assets during the construction phase. Additional constraints are not anticipated for the road network because of construction traffic. There is potential for damage to other material assets, including power lines, during the construction phase. Moderate negative effects are identified for the construction phase pre- and post-mitigation. Neutral effects are identified for the operational phase.

4. Mitigation

4.1. Mitigation measures are measures to prevent, reduce or off-set adverse environmental effects that have been identified. In addition, it is important to consider measures aimed at enhancing positive effects.

4.2. Mitigation measures have been identified through the SEA and HRA processes and the topic-based assessments in the EAR. A summary of the recommended general mitigation identified in the SEA is identified below with further detail presented in Appendix B. As described in Chapter 2, It should be noted that these mitigation measures are indicative at this stage and would be confirmed as the design develops at subsequent project stages.

4.3. Although these measures do not always completely eliminate effects or result in the downgrading of effects, from moderate to minor for example, they could contribute to reducing the effects identified for the SEA objective. For mitigation required in relation to European Sites, please refer to Technical Supporting Document B2, Habitats Regulations Assessment.

4.4. Proposed mitigation measures, which apply to both the T2AT SRO Options, include:

- Biodiversity, flora and fauna:
  - Avoid designated sites by re-routing the pipeline where reasonably practicable.
  - Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat.
  - Undertake ecology surveys at future design stages.
  - Ecological Method Statements and in person Ecological Clerk of Works surveys.
  - Implement mitigation as set out in the informal HRA (Technical Supporting Document B2, Habitats Regulations Assessment).
  - Review HRA as the design is developed and undertake a full assessment pursuant to the consenting process.
  - Investigate opportunities for nature based solutions and BNG such as creation of high value habitat, habitat creation or improvement works within habitat network zones to support nature recovery network and create wildlife corridors.
- Soil:
  - Reinstate disturbed ground where reasonably practicable, returning it to its original state, following construction.

- Implement best practice construction techniques when working within or within close proximity to historic or authorised landfill sites to prevent potential disturbance of contaminants.
- Undertake a detailed soil survey and/or agricultural land survey to inform the development and implementation of a Soil Management Plan with appropriate mitigation.

- Water:
  - Implement measures to reduce the potential effects of flooding on the construction and operational phases.
  - Implement pollution prevention and control measures to reduce likelihood of contamination of the water environment during construction.
  - Utilise directional drilling and pipejack crossings where reasonably practicable.
  - Undertake further hydrological assessments for works within SPZ1 and SPZ2, and implement appropriate mitigation as required.
  - Monitor river levels and flows and implement appropriate mitigation if required.
- Air:
  - Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality.
- Climatic factors:
  - Capital carbon mitigation through material selection, optimising the design of the WTW to reduce use of high carbon materials, reducing pipe size diameter, consideration given to not installing dual tunnels at every trenchless crossing, reviewing backfill and reinstatement to reduce the amount of imported material required, consideration given to single rather than dual supply for pumping stations and waste minimisation, e.g. through use of modular or off-site manufacture options.
  - Reducing operational carbon at carbon hotspot areas such as optimising energy efficiency and maintenance activities to prolong asset life/ performance, low carbon power generation and decarbonised electricity procurement choices and renewable energy generation.
  - Monitor river levels and flows and implement appropriate mitigation if required.
- Landscape:
  - Implement best practice construction methods, such as screening, to minimise visual disturbance and also implement screening to reduce visual effects of above ground permanent infrastructure.
  - Refinement of construction corridor and location of above ground structures to reduce vegetation loss.
  - Avoid construction of permanent structures on undeveloped land.

- Reinstate land, where reasonably practicable, to original state following the construction phase.

- Historic environment:
  - Implement best practice construction methods to minimise effects on the setting of nearby historic assets.
  - Design considerations to minimise the effects on the setting of assets and the inclusion of measures such as strategic planting or other landscaping.
  - Depending on the presence of archaeology, further survey work and an Archaeological Watching Brief may be required.
- Population and human health:
  - Implement best practice construction methods, such as noise and vibration reduction, selection of appropriate working hours, to reduce effects on the local community.
  - Consider appropriate diversions where public rights of way are affected during construction.
  - Review design to avoid changes to environmental conditions.
- Material assets:
  - Implement sustainable design measures to reduce resource use and waste.
  - Source materials locally where reasonably practicable.
  - Utilise directional drilling where reasonably practicable to minimise disruption to built assets and infrastructure.
  - Implement a Construction Traffic Management Plan (CTMP) to minimise traffic related disruption during the construction phase.
  - Selection of appropriate machinery where construction is located within proximity to power lines.

4.5. Beyond the mitigation measures identified for both of the T2AT SRO Options outlined above, specific measures have been identified based on the potential effects specific to each of the options. These are presented in Table 4.1.

Table 4.1: Mitigation measures specific to the Lower Thames Reservoir Option and Beckton Reuse Indirect Options

SEA topic	Lower Thames Reservoir Option	Beckton Reuse Indirect Option
Biodiversity, flora and fauna	No specific mitigation measures beyond those outlined in the section above (paragraph 4.4).	Ensure monitoring is carried out and appropriate mitigation measures are implemented at the intake at the Chingford Reservoir SSSI as part of the Beckton Reuse Indirect Option. Route pipeline to avoid effects on areas of ancient woodland as part of the Beckton Reuse Indirect Option.
Historic Environment	Consideration of the listed building within the design of the new WTW for the Lower Thames Reservoir Option at the Indicative WTW Site, strategic planting and other landscaping to minimise setting effect.	No specific mitigation measures beyond those outlined in the section above (paragraph 4.4).
Population and human health	Setting out how engagement with local communities would be undertaken during construction, including with the golf course should temporary land acquisition and closure of parts of the golf course be required during construction	No specific mitigation measures beyond those outlined in the section above (paragraph 4.4).

5. Cumulative assessment

5.1 Introduction

5.1. An initial cumulative effects assessment has been undertaken as part of the SEA option update for the Gate 2 submission for the T2AT SRO. The assessment identifies potential cumulative effects of the Lower Thames Reuse Option and Beckton Reuse Indirect Option with other plans, programmes and projects. It is understood that if T2AT is selected as an option in the WRSE Regional Plan, as well as Thames Water WRMP24 and Affinity Water WRMP24, it will be subject to further cumulative effects assessment with the other selected options, neighbouring water companies plans and neighbouring regional plans. Until the WRSE Best Value Regional Plan has been developed and agreed it is not known when the T2AT SRO Option would be implemented, and therefore, which other developments could act in-combination with it.

5.2. The cumulative effects assessment has been undertaken as per the cumulative effects assessment methodology (version 3, 27 April 2022, Mott MacDonald), which provides a proportionate approach to the cumulative effects assessment, which is cognisant of the work being undertaken for the Regional Plan and WRMPs, the timing of an Environmental Impact Assessment (EIA) within the anticipated future consenting programme, the level of design detail available at Gate 2, and the level of environmental appraisal that has been undertaken for Gate 2. The focus of the approach is on identification of risks due to potential cumulative effects of SROs with other plans and projects that would need to be addressed at future gates and for which additional mitigation may be required.

5.3. The following plans, programmes and projects have been considered within the cumulative effects assessment:

- Other SROs
- Other water company schemes
- Local Development Frameworks
- Relevant planning applications
- NSIP/DCOs (none identified as relevant within the study area)

5.4. The cumulative effects assessment applies only to the preferred options pertaining to the Lower Thames Reservoir Option and Beckton Reuse Indirect Option as part of the Gate 2 submission. For this initial assessment, a 2km Zone of Influence (ZoI) was used to identify other plans, programmes and projects that could have cumulative effects. This was extended to 3km from relevant European Sites to allow an in-combination effects assessment to be undertaken, if required, as part of the HRA

process. This was based upon professional judgment and the potential effects that may arise from the T2AT Options.

5.5. It should be noted that as the RAPID process progresses, and the scheme is refined at subsequent project stages, the topic ZoIs would need to be reviewed and updated, as necessary. As the ZOIs change, data collection on 'other developments' would therefore also be reviewed and updated ahead of a future EIA Scoping Opinion request.

5.6. The cumulative assessment only considers the cumulative effects of the T2AT Options with another plan, programme or project. It does not consider the potential cumulative effects if all of these were to be implemented at the same time.

5.7. The identification of other plans, programmes or projects is based on the following assumptions for the construction and operational programmes of the T2AT Options. Dates are based on the WRSE emerging draft plan that was issued for consultation in January 2022[10]:

- Lower Thames Reservoir Option: A construction period of 2035 – 2039 has been assumed and the option is anticipated to be operational from 2039.
- Beckton Reuse Indirect Option: A construction period of 2030 – 2034 has been assumed and the option is anticipated to be operational from 2034.

5.2 Lower Thames Reservoir Option

5.8. A summary of the local development frameworks, planning applications and other developments considered as part of the cumulative assessment for the Lower Thames Reservoirs Option are presented in the sections below. Appendix C presents the assessment in full.

5.2.1 Strategic Resource Options

5.9. No other SROs are geographically near to the Lower Thames Reservoir Option and therefore effects during construction are unlikely to occur. Cumulative operational effects are unlikely.

[10] Water Resources South East (2022) Our Regional Plan. Available at: https://wrse.uk.engagementhq.com/our-regional-plan [last accessed October 2022]

5.2.2 Other water company schemes

5.10. Thames Water and Affinity Water have confirmed that there are no other relevant water company schemes that would need to be considered at this stage.

5.2.3 Local development frameworks

5.2.3.1 Three Rivers District Council, Batchworth Golf Course, New Local Plan – Sites for Potential Allocation

5.11. Batchworth Golf Course is a site for potential allocation 618 houses, required to provide a primary school, open space and play space. The site is located 1.3km from the Harefield Service Reservoir Connection. The phasing of the works of the Batchworth Golf Course allocation is six to 16 years. There is therefore potential for construction programmes to overlap with the Lower Thames Reservoir Option. If construction periods overlap then there is the potential for minor cumulative construction effects arising from visual intrusion, noise, vibration and air quality. Potential receptors include Bishops Wood Country Park (LWS), Batchworth Heath (LWS), BMI Bishops Wood Hospital, Mount Vernon Hospital, Michael Sobell Hospice, Bishops Wood, Woodcock Hill, Rickmansworth (open access area), DM7 Landscape Character area Landscape Region – South Herts Plateau.

5.12. No cumulative impacts resulting from operation are anticipated.

5.2.3.2 Pre-Submission Spelthorne Local Plan 2022-2037 – Spelthorne Borough Council

5.13. The Local Plan proposes a site allocation (ST4/009 (Elmsleigh Centre and Adjoining Land, South Street)) for 850 residential units and retail / commercial town centre uses. The construction period of the development has an anticipated overlap with the Lower Thames Reservoir Option. The site allocation is approximately 8km from the Lower Thames Reservoir Option, however, as it is within is within 3km of the South West London Waterbodies SPA and Ramsar, cumulative effects were considered. The HRA AA conducted for the Lower Thames Reservoir Option concluded that no adverse effect to the integrity of the South West London Waterbodies Valley SPA and Ramsar are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The distance between the developments and the Lower Thames Reservoir Option are also significant enough that no other common receptors were identified with potential for cumulative effects.

5.2.3.3 Buckinghamshire Minerals and Waste Local Plan (to 2036)

5.14. The following allocated sites within the Buckinghamshire Minerals and Waste Local Plan were also considered:

- M3: New Denham Quarry Extension, Allocated Site for Sand and Gravel Provision
- M4: New Denham Quarry North West Extension, Allocated Site for Sand and Gravel Provision

5.15. These are allocated sites for mineral extraction and are adjacent to the Drinking Water Transfer Main Route Corridor. The plan period is up to 2036 so there could potentially be an overlap with the construction phase of the Lower Thames Reservoir Option. If construction periods overlap then there is the potential for minor cumulative construction effects arising from visual intrusion, noise, vibration and air quality on the local community and other sensitive receptors. Fray's Farm Meadows SSSI and Fray's Valley LNR, and Kingcup Meadows and Oldhouse Wood SSSI are all within 2000m of both the Drinking Water Transfer Main Route Corridor and the New Denham Quarry allocation therefore there is potential for cumulative indirect effects if construction periods were to overlap.

5.2.4 Planning applications

5.2.4.1 2019/0215 – Surrey County Council

5.16. The application is for extraction of sand and gravel that would operate over a period of 14 years and is therefore anticipated to overlap with the construction period for the Lower Thames Reservoir Option. The option is over 30km from the Lower Thames Reservoir Option, however, it is within 3km of the South West London Waterbodies SPA and Ramsar. The HRA AA conducted for the Lower Thames Reuse Indirect Option concluded that no adverse effect to the integrity of the South West London Waterbodies SPA and Ramsar are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The distance between the developments and the Lower Thames Reservoir Option are also significant enough that no other common receptors were identified with potential for cumulative effects.

5.2.4.2 Buckinghamshire Council, Buckinghamshire Council (CM/0049/21)

5.17. This is an application for a phased extraction of an allocated sand and gravel deposit, including for the construction and use of a new bell mouth access off North Park. The application is awaiting a decision. The development has an estimated period of operation of seven to eight years and is therefore likely to be fully built out before

construction of the Lower Thames Reservoir Option commences in 2035, however, would need to be considered as part of a future cumulative effects assessment in terms of temporal effects, for example on local communities, and the potential deterioration of the environment as a result of successive developments.

5.2.5 Nationally significant infrastructure

5.18. The following developments were considered as part of the cumulative effect assessment:

- UK Government Hybrid Bill HS2 Phase One – this is likely to be completed between 2029 and 2033, and therefore would be fully built out and operational by the anticipated start of construction for the Lower Thames Reservoir in 2035.
- Planning Inspectorate, Western Rail Link to Heathrow – the timing of this development is uncertain as 2018 consultation material suggests a Summer 2019 DCO application, with works due to be completed by 2027 and a new rail service operational by 2028; the Planning Inspectorate website[11] currently states DCO application expected to be submitted in Winter 2021/2022 and the Network Rail website[12] suggests a Winter 2022 submission. Even with a delayed submission, it is anticipated that the scheme would be fully built out and operational by 2035.

5.19. These developments are located within 1km of the Lower Thames Reservoir Option. As described above, in the case of both, development is likely to be fully built out before construction of the Lower Thames Reservoirs Option commences, however, they would need to be considered as part of a future cumulative effects assessment in terms of temporal effects, for example on local communities, and the potential deterioration of the environment as a result of successive developments. These developments would also need to form part of the future baseline for the EIA. In particular, the future baseline in relation to area north and south of the crossing of the HS2 Phase One would need to be considered.

5.3 Beckton Reuse Indirect Option

5.20. A summary of the options, schemes, local development frameworks, planning applications and other developments considered as part of the cumulative assessment for the Beckton Reuse Indirect Option are presented in the sections below. Appendix D presents the assessment in full.

[11] https://infrastructure.planninginspectorate.gov.uk/projects/south-east/western-rail-link-to-heathrow/?ipcsection=overview
[12] https://www.networkrail.co.uk/running-the-railway/our-routes/western/western-rail-link-to-heathrow/

5.3.1 Strategic Resource Options

5.21. The source of water for the Beckton Reuse Indirect Option is the River Lee. However, the natural flow in the river is insufficient and so operation of the scheme would be dependent on recycled water being fed into the river from the London Effluent Reuse SRO.

5.22. During construction of the Beckton Reuse Indirect Option, there is a risk of construction related impacts on the aquatic communities associated with the river (Lea Navigation Enfield Lock to Tottenham Locks). The construction related impacts include localised impacts on water quality due to increased sediment loads and/or pollution incidents. Temporary disturbance of fish communities (including migratory species such as European eel) could also occur. Overall, the aquatic communities associated with the construction activities are considered to be tolerant and impacts are considered temporary and reversible. Any impacts on the aquatic communities are therefore expected to be short term with, no or negligible change in aquatic ecological community receptors expected. Cumulative effects with the London Effluent Reuse SRO are therefore unlikely during construction.

5.23. The operational impacts on the River Lee have been assessed as part of the London Effluent Reuse SRO. The operation of the Beckton Reuse Indirect Option, therefore, assumes that sufficient water would be available for the abstraction and that impacts on the aquatic communities are considered negligible. During maintenance of any infrastructure, impacts are likely to be negligible. Cumulative effects with the London Effluent Reuse SRO are therefore unlikely during operation.

5.24. There are no other SROs geographically near to the Beckton Reuse Indirect Option and therefore cumulative effects during construction are unlikely to occur. Cumulative operational effects with other SROs are also unlikely.

5.3.2 Other water company schemes

5.25. Thames Water and Affinity Water have confirmed that there are no other relevant water company schemes that would need to be considered at this stage.

5.3.3 Local development frameworks

5.3.3.1 Policy WAL E8 – Epping Forest Local Plan (2011-2033), Epping Forest District Council

5.26. Epping Forest Local Plan (2011-2033) includes a 40,000m^2 employment allocation site located North of the A121. It is located under 500m from the Beckton Reuse Indirect Option. The plan period for this development is up to 2038 and as such, there is potential for construction works to overlap with potential for cumulative effects from noise, dust, light and vibration pollution. The following designated sites were considered: Stream and Old River Lea SSSI, Turnford & Cheshunt Pits SSSI, Epping Forest SAC, Epping Forest SSSI, Lee Valley SPA and Lee Valley Ramsar. The HRA Stage 1 ToLS identified no LSE for the Epping Forest SAC. The HRA Stage 2 AA identified transmission pathways but concluded that no adverse effects on the integrity of Lee Valley SPA and Lee Valley Ramsar are likely if the suggested mitigation measures are implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated.

5.27. During construction, there is the potential for temporary cumulative effects to local community from noise and air pollution as well as effects on access to facilities, potential receptors include King Harold School and Abbey Garden and residential areas in Waltham Abbey.

5.28. There is potential for cumulative effects on SPZs resulting from construction with both developments intersecting the same SPZ.

5.29. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which would not be visible to the nearby residential receptors and would not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that when combined with the Beckton Reuse Indirect Option, the reported effects would result in cumulative effects upon operation.

5.3.3.2 Waltham Abbey North Masterplan – Policies WAL T1, R1, R2 & R3 – Epping Forest Local Plan (2011-2033), Epping Forest District Council

5.30. Waltham Abbey North Masterplan Area is allocated to accommodate 612 homes and is approximately 2km from the Beckton Reuse Indirect Option. The plan period for this development is up to 2038 and as such, there is potential for construction works to overlap. During the construction period, depending on the timings of construction, there is potential for cumulative effects from noise, dust, light and vibration pollution on the following designated sites: Cornmill Stream and Old River Lea SSSI, Waltham Abbey SSSI, Turnford & Cheshunt Pits SSSI. The HRA Stage 2 AA identified transmission pathways but concluded that no adverse effects on the integrity of Lee Valley SPA and Lee Valley Ramsar are likely if the suggested mitigation measures are observed, with no residual effects expected. Therefore, no cumulative effects are

anticipated.

5.31. The development of the allocated sites within Waltham Abbey have the potential to result in air pollution that could impact upon air quality, including Epping Forest. The Beckton Reuse Indirect Option is anticipated to have minor impacts on air quality in AQMA regions, however construction and operational vehicle flows are unlikely to be above the screening threshold of 100 HDVs and/or 500 LDVs. However, should construction activities overlap, it is recommended that traffic management measures are discussed and agreed with regulators to minimise risks of cumulative effects on air quality.

5.32. There is potential for construction activities to have cumulative effects on the local community from noise and air pollution as well as effects on access to facilities. Potential receptors identified include King Harold School and Abbey Garden and residential areas in Waltham Abby.

5.33. There are areas of Flood Zone 2 and 3 within 1km of Areas WAL T1, R1, R2 & R3 – Epping Forest Local Plan (2011-2033) and the Beckton Reuse Indirect Option pipeline. However, there is not anticipated to be cumulative construction or operational effects related to flood risk.

5.34. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which would not be visible to the nearby residential receptors and would not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option.

5.3.3.3 Policy CH1 – Local Plan 2018-2033 Policy CH1 – Local Plan 2018-2033, Broxbourne District Council

5.35. Chestnut Lakeside will be developed as a new mixed use urban village to accommodate 1,750 homes. Cheshunt Lakeside development is over 2km North of the Beckton Reuse Indirect Option, however, the development is less than 400m from Lee Valley SPA and Ramsar. The HRA carried out by the council indicated the plan was likely to have an adverse effect on the qualifying interests of the SPA (Bittern, Gadwall and Shoveler). The HRA AA undertaken for the Beckton Reuse Indirect Option identified transmission pathways but concluded that no adverse effects on the integrity of Lee Valley SPA and Lee Valley Ramsar are likely if the suggested mitigation measures are observed, with no residual effects expected. Therefore, no cumulative effects are anticipated.

5.36. There is potential for cumulative effects from construction resulting from noise and air pollution, with temporary impacts on residential areas within Waltham Cross. The closest element of the scheme to the development is the pipeline which would not be visible to the nearby residential receptors and would not have any operational

noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option.

5.3.3.4 Policy CH2 – Local Plan 2018-2033, Broxbourne District Council

5.37. Policy CH2 – Local Plan 2018-2033 Rosedale Park will be developed as a series of interlinked new suburban parkland communities to accommodate 800 homes. It is approximately 2km from the Beckton Reuse Indirect Option. The planned period for this development is up to 2038, and there is therefore potential for construction works to overlap.

5.38. There is potential for temporary cumulative effects resulting from noise, dust, light and vibration pollution on the following LWSs: Meadow of Tudor Village LWS, Longmead Farm Meadows LWS, Albury Fields LWS, Poyndon Farm LWS. Noise and air pollution during construction may also have temporary cumulative effects on residential areas in Goff's Oak and the following community facilities: Rosedale sports ground, St James Church, Woodside Primary School, Goff's Oak Primary School.

5.39. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which would not be visible to the nearby residential receptors and would not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option.

5.3.3.5 Policy PB2 – Draft Local Plan, Hertsmere Borough Council, Broxbourne District Council

5.40. The former Potters Bar Golf Course is proposed for development. The new development will provide a sustainable new neighbourhood delivering around 500 new homes. The plan period for this development is up to 2038, and there is therefore potential for construction works to overlap.

5.41. There are areas of Flood Zone 2 and 3 that are within 1km of the development and the pipeline element of the Beckton Reuse Indirect Option. However, there is not anticipated to be cumulative construction or operational effects related to flood risk.

5.42. There is potential for cumulative effects on SPZs resulting from construction with both developments intersecting the same SPZ.

5.43. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which would not be visible to the nearby residential receptors and would not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option.

5.3.3.6 Policy PB3 – Draft Local Plan, Hertsmere Borough Council

5.44. Land to the south of Potters Bar is proposed for development for around 900 new homes. There is potential for construction works to overlap however, the plan is over 2km from any designated sites and over 3.5km from proposed construction sites associated with the Beckton Reuse Indirect Option. No notable cumulative effects on any other sensitive receptors are anticipated during construction or operation.

5.3.3.7 Policy NS1 – Draft Local Plan, Hertsmere Borough Council

5.45. The NS1 Plan period is up to 2038. There is an area of Green Belt Land within Shenley Parish being considered for a New Garden Village with leisure, educational, employment and business facilities. Initially 2,400 homes are proposed, with capacity for up to 6,000 homes.

5.46. During the construction period, depending on the timings of construction, there is potential for cumulative effects from noise, dust, light and vibration pollution on the following designated sites: Redwell Wood SSSI and Colney Heath LNR.

5.47. There is potential for cumulative effects on SPZs resulting from construction with both developments intersecting the same SPZ.

5.48. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which would not be visible to the nearby residential receptors and would not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option.

5.3.3.8 Other local development frameworks

5.49. The following developments are identified to have overlapping construction periods with the Beckton Reuse Indirect Option and were therefore considered within the cumulative assessment given the developments are within 3km of the Lee Valley SPA and Ramsar:

- 2013/3223 - London Borough Hackney
- Policy SA13 – Draft Local Plan - London Borough Enfield
- Policy SA15 – Draft Local Plan - London Borough Enfield
- Policy SA19 – Draft Local Plan - London Borough Enfield
- Policy SA01 – Proposed Submission Waltham Forest Local Plan Part 2 - London Borough Waltham Forest
- Policy SA02 - Proposed Submission Waltham Forest Local Plan Part 2 - London Borough Waltham Forest
- Policy SA03 - Proposed Submission Waltham Forest Local Plan Part 2 - London Borough Waltham Forest
- Policy SA16 - Proposed Submission Waltham Forest Local Plan Part 2 - London Borough Waltham Forest
- Policy SA19 - Proposed Submission Waltham Forest Local Plan Part 2 - London Borough Waltham Forest
- Policy SA38 - Proposed Submission Waltham Forest Local Plan Part 2 - London Borough Waltham Forest

5.50. No cumulative effects were identified for construction or operational phases. The HRA AA conducted for the Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Lee Valley Ramsar are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The distances between the developments and the Beckton Reuse Indirect Option are also significant enough that no other common receptors were identified with potential for cumulative effects.

5.3.4 Planning applications

5.51. There was one relevant submitted planning application considered within the cumulative assessment:

- HGY/2021/3175 - London Borough Haringey

5.52. The application is for demolition of buildings and the creation of new mixed-use development with up to 2,869 new homes and at least 7,225sqm of commercial, office, retail and community uses. The development will also contain a new public park, public square and other landscaped public realm and pedestrian & cycle routes.

5.53. The development is approximately 7km from the Beckton Reuse Indirect Option, however as it within 3km of the Lee Valley SPA and Ramsar. No cumulative effects were identified for construction or operational phases. The HRA AA conducted for the Beckton Reuse Indirect Option concluded that no adverse effect to the integrity of the Lee Valley SPA and Lee Valley Ramsar are likely if appropriate mitigation is

implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The distance between the developments and the Beckton Reuse Indirect Option are also significant enough that no other common receptors were identified with potential for cumulative effects.

5.3.5 Other developments

5.54. There were no other relevant developments to be considered within the cumulative assessment at the time of writing.

5.4 Summary

5.55. The cumulative assessment has considered the potential cumulative effects of the Lower Thames Reservoir and Beckton Reuse Indirect Options with water company options, SROs, other plans and developments.

5.56. Both the Lower Thames Reservoir Option and Beckton Reuse Indirect Option have the potential to have cumulative effects with other plans, programmes and projects on receptors during the construction phase. No operational effects are anticipated. The HRA AA conducted for both options identified no adverse effect to the integrity of European Sites, if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated.

6. Summary and recommendations

6.1 Summary

6.1. This section summaries the conclusions based on the SRO SEA findings and additional assessment that has been undertaken to date for the T2AT SRO Options. The effects described below are those identified for the construction and operational phases.

6.2. Major positive effects have been identified for both options for the SEA objective on delivering reliable and resilient water supplies given the options improve the transfer of water across regions.

6.3. Carbon would be generated as a result of construction as well as during operation. The SEA identified minor negative effects associated with carbon emissions during the construction phase and moderate negative effects during the operational phase.

6.4. Major negative effects (pre-mitigation) and moderate negative effects (post-mitigation) were identified for biodiversity, flora and fauna for the construction of the Beckton Reuse Indirect Option given the new intake is located within the Chingford Reservoir SSSI. There is potential for effects on international and nationally designated sites, and potential impacts on priority habitat, protected species and woodland for both options during the construction phase.

6.5. The HRA ToLS for the Lower Thames Reservoir Option identified potential for uncertain effects on the South West London Waterbodies SPA and Ramsar site therefore HRA Stage 2 AA was undertaken. The AA identified, with appropriate mitigation, there is not likely to be adverse effects on the integrity of these sites, with no residual effects expected. The HRA ToLS for the Beckton Reuse Indirect Option identified the potential for LSE on the Lee Valley SPA and Ramsar site and Wormley Hoddesdonpark Woods SAC as a result of the construction phase and HRA Stage 2 AA was therefore undertaken. The AA identified no adverse effects on the integrity of the sites where appropriate mitigation is implemented with no residual effects expected. The HRA would be reviewed as the design develops and a full assessment undertaken pursuant to the consenting process. Please refer to Technical Supporting Document B2, Habitats Regulations Assessment for further information.

6.6. Moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were also identified for the construction phase for the SEA objective on soil given the potential for disturbance and permanent loss of agricultural land (Grade 2, 3 and 4 for the Lower Thames Reservoir Option and Grade 3 for the Beckton Reuse Indirect Option). There is potential for both of the options to disturb contaminants given they intersect or are within close proximity to historic and authorised landfill sites. The construction phase of both options also has the potential to cause disruption to built assets and infrastructure therefore moderate

negative effects (pre-mitigation) and minor negative effects (post-mitigation) identified.

6.7. The options both pass through AQMAs with moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) identified for the SEA objective on air quality at the construction phase.

6.8. Given both options pass through community or recreational facilities, moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified for both objectives related to population and human health at the construction phase.

6.9. For the historic environment objective, moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) were identified for the Lower Thames Reservoir Option at the construction phase given there is a Grade II listed building within the indicative location of the new WTW.

6.10. For the SEA objective on flood risk, the Beckton Reuse Indirect Option is identified to have moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) for both the construction and operational phases given the locations of elements of the Option within Flood Zone 2 and 3. The Lower Thames Reuse Option is identified to have moderate negative effects (pre-mitigation) and minor negative effects (post-mitigation) as a result of potential construction related flood risk as it passes through Flood Zones 2 and 3. Minor negative or neutral effects were identified for the remaining SEA objectives.

6.11. Mitigation measures to prevent, reduce or off-set adverse environmental effects have been identified as part of the SEA. These measures do not always completely eliminate effects or result in the downgrading of effects, from moderate to minor for example, however they do contribute to reducing the effects identified for the SEA objective. It should be noted that these mitigation measures are indicative at this stage and would be confirmed as the design develops at subsequent project stages; any residual effects are therefore also indicative at this stage..

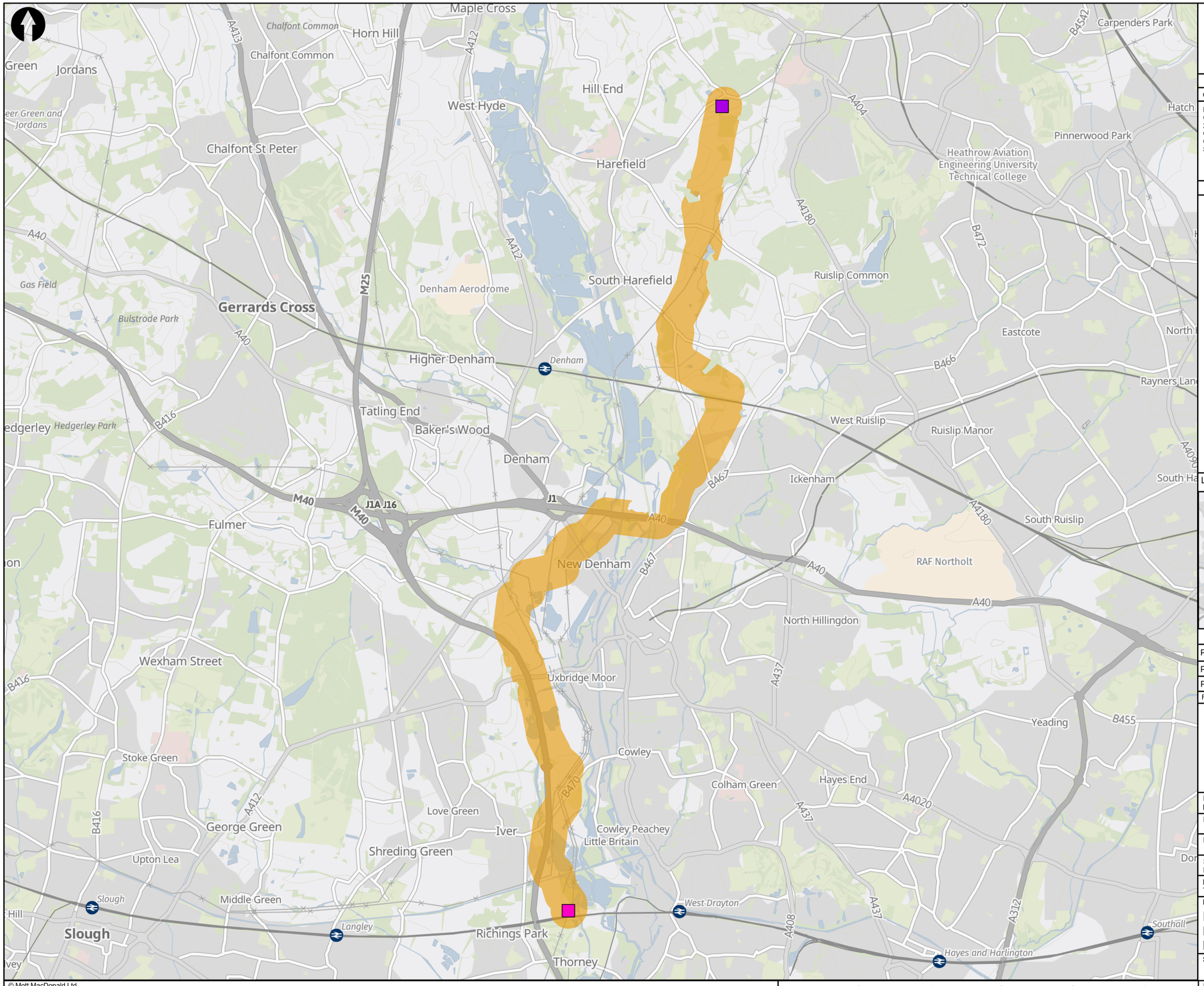
6.12. The cumulative assessment has considered the potential cumulative effects of the Lower Thames Reservoir and Beckton Reuse Indirect Options with other plans, programmes and projects. Both the Lower Thames Reservoir Option and Beckton Reuse Indirect Option have the potential to have cumulative effects with other plans, programmes and projects on receptors during the construction phase. No operational effects are anticipated. The HRA AA conducted for both options identified no adverse effects on the integrity of European Sites, with no residual effects expected. Therefore, no cumulative effects are anticipated.

6.2 Recommendations

6.13. It is recommended that the following actions are undertaken in order to take the SRO forward at subsequent project stages:

- The mitigation measures identified in this report inform the development of the SRO, including future technical work recommended for subsequent project stages.
- The environmental assessment information from the SEA is fed into the WRSE Regional Plan and the Thames Water and Affinity Water WRMP24s. Solutions are more appropriately assessed for SEA purposes as part of SEA for WRMP and Regional Plans.
- Discuss with regulators / SEA statutory consultees any future need for SEA, with the assumption being that EIA is the most appropriate mechanism for more detailed environmental assessments at subsequent Rapid Gate milestones.
- Review the cumulative effects assessment as required given all the developments which could act in-combination with T2AT are currently unknown.

Appendix A Maps



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Current Revision Information

Lower Thames Reservoir option components: Mott MacDonald (Apr 2022).
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Legend

Lower Thames Reservoir Option components
- Indicative Transfer Main Route Corridor
- Connection into Affinity Water distribution network
- Connection into raw water network

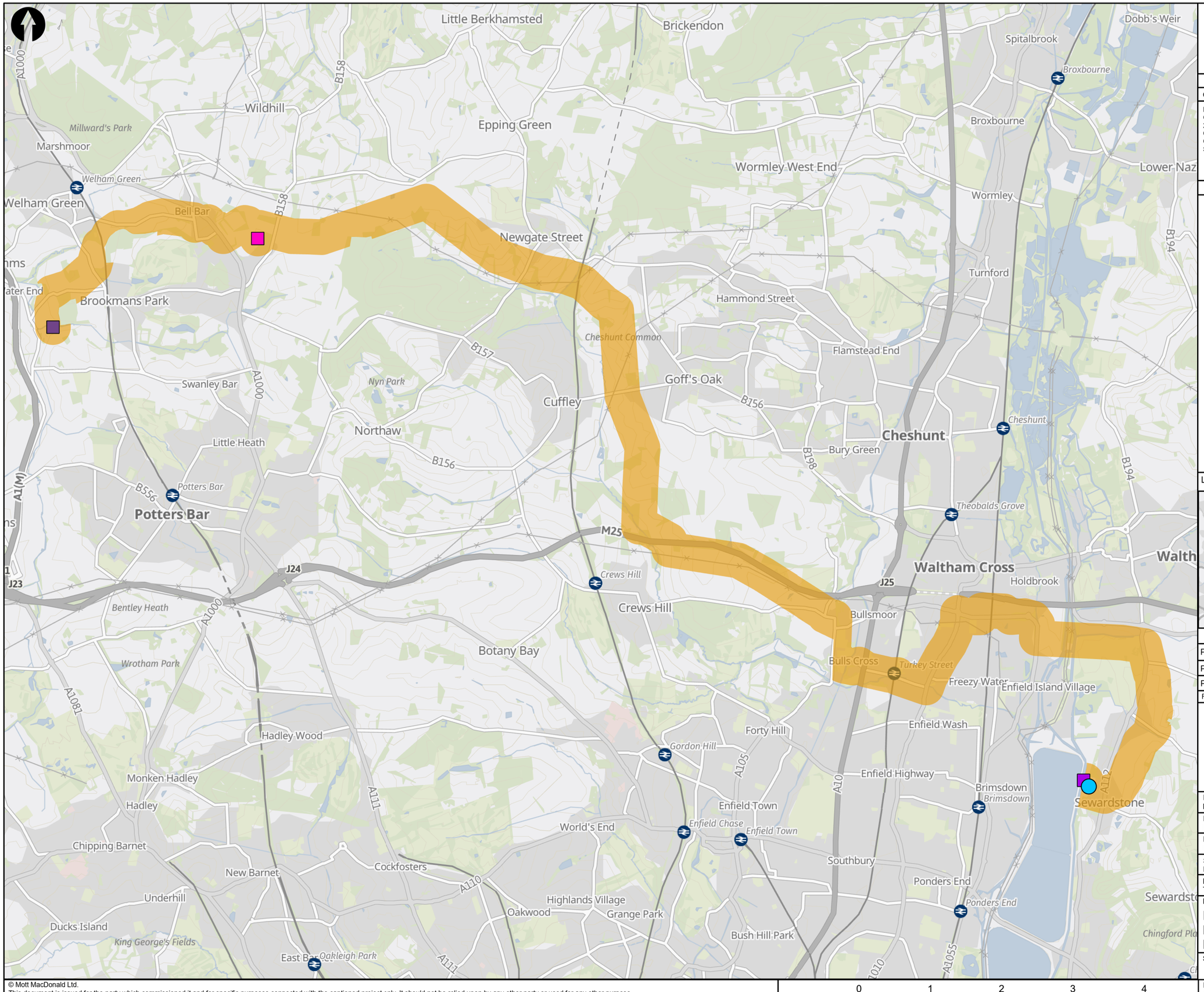
Location Map

Rev	Status	Suitability description	Author	Ch'k'd	App'd	Date
P03	S2	FOR INFORMATION	CD	CLB	CLB	18/10/22
P02	S2	FOR INFORMATION	CD	CLB	CLB	21/09/22
P01	S2	FOR INFORMATION	KL	CLB	CLB	27/05/22

Thames Water
Affinity Water

Location Code: N/A	OS Reference:	Security Reference: STD
Project Group: N/A	Sub Process: N/A	
Location/Town: N/A		
Site Name: Lower Thames Reservoir		
Project Name: T2AT SRO Gate 2 Environmental Assessments		
Drawing Title: Figure 2.1: Lower Thames Reservoir Option – key components		
Scale: 1:50,000	Sheet Size: A3	Status: S2
Drawing Number: 100383187-023-MMD-00-XX-GIS-Y-0058		Revision: P03

0 1 2 3 4 Kilometres



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Current Revision Information

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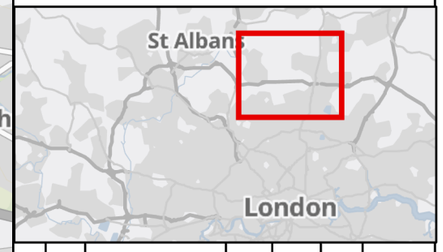
Legend

Beckton Reuse Indirect Option components

- Indicative Transfer Main Route Corridor
- Indicative Raw Water Pumping Station Site
- River Lee Intake
- Connection into the Affinity Water distribution network 1
- Connection into the Affinity Water distribution network 2

Location Map



Rev	Status	Suitability description	Author	Ch'k'd	App'd	Date
P03	S2	FOR INFORMATION	CD	CLB	CLB	18/10/22
P02	S2	FOR INFORMATION	CD	CLB	CLB	21/09/22
P01	S2	FOR INFORMATION	KL	CLB	CLB	20/06/22

Thames Water

Affinity Water

Location Code: N/A	OS Reference:	Security Reference: STD
Project Group: N/A	Sub Process: N/A	
Location/Town: N/A		
Site Name: Beckton Reuse Indirect		
Project Name: T2AT SRO Gate 2 Environmental Assessments		
Drawing Title: Figure 2.2: Beckton Reuse Indirect Option – Key Components		
Scale: 1:50,000	Sheet Size: A3	Status: S2
Drawing Number: 100383187-023-MMD-00-XX-GIS-Y-0062		Revision: P03

0 1 2 3 4 Kilometres

Appendix B SEA matrices

SEA Scoring Criteria	SEA Metrics
+++	8
++	4
+	1
0	0
-	-1
--	-4
---	-8
?	
Select	

SEA Objective	Datasets/Key Themes	Effect		Description
Biodiversity, Flora, Fauna: Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	SPA SAC Ramsar site SSSIs MPA MCZ NNR LNR Priority habitats and species Non-designated sites Terrestrial, aquatic and marine habitats, species and protected sites Green networks and corridors (e.g. foraging areas and commuting routes, migration routes, hibernation areas etc. at all scales)	+++	Major Positive	The option would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. The option would result in a major reduction or management of INNS.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. The option would result in a moderate reduction or management of INNS.
		+	Minor Positive	The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. The option would result in a minor reduction or management of INNS.
		0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.
		-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. The option would result in a minor increase or spread of INNS.
		--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. The options would result in a moderate increase or spread of INNS.
		---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain

Soil: Protect and enhance the functionality, quantity and quality of soils	Agricultural Land Classification Landfill sites – authorised and historic	+++	Major Positive	The option would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
		0	Neutral	The option would not result in any effects on soils or land use.
		-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination.
		--	Moderate Negative	The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation.
		---	Major Negative	The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
Water: Increase resilience and reduce flood risk Protect and enhance the quality of the water environment and water resources Deliver reliable and resilient water supplies	Environment Agency Flood Defences Environment Agency Main Rivers Flood Zones 2 and 3 Surface Water Features WFD River Waterbody Catchments WFD River Waterbodies Cycle 2 Bathing Waters (for desal options) Shellfish Waters (desal options) Source Protection Zones WFD Groundwater bodies	+++	Major Positive	The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk. The option would result in a major improvements in water efficiency, reduces demand and improves resilience.
		++	Moderate Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a moderate improvement to flood risk. The option would result in a moderate improvements in water efficiency, reduces demand and improves resilience.
		+	Minor Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option would result in a minor improvement to flood risk. The option would result in a minor improvements in water efficiency, reduces demand and improves resilience.
		0	Neutral	The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk.
		-	Minor Negative	The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated. The option would result in minor decreases in groundwater quality or levels. The option is located in Flood Zone 2. The option would result in minor decreases in water efficiency, increases demand and reduces resilience.
		--	Moderate Negative	The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the likely deterioration of WFD classification. The option would result in moderate decreases in groundwater quality or levels. The option is located in Flood Zone 3. The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.
		---	Major Negative	The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the deterioration of WFD classification. The option would result in major decreases in groundwater quality or levels. The option is located in Flood Zone 2 or 3 and further contributes to flood risk. The option would result in major decreases in water efficiency, increases demand and reduces resilience.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Air: Reduce and minimise air emissions	Air Quality Management Zones Air quality monitoring sites	+++	Major Positive	The option would result in a major enhancement of the air quality within one or more AQMAs.
		++	Moderate Positive	The option would result in a moderate enhancement of the air quality within one or more AQMAs.
		+	Minor Positive	The option would result in an enhancement of the air quality.
		0	Neutral	The option would not result in any effects on Air Quality and AQMAs.
		-	Minor Negative	The option would result in a decrease of the air quality.
		--	Moderate Negative	The option would result in a decrease of the air quality within one or more AQMAs.
		---	Major Negative	The option would result in a major decrease in the air quality within one or more AQMAs.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.

Climate Factors: Reduce embodied and operational carbon emissions Reduce vulnerability to climate change risks and hazards	Option Carbon data UKCP18 climate data Sea level rise projections	+++	Major Positive	The option will generate significant additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale) The option will result in a major increase in carbon sequestration. The option will increase resilience/decrease vulnerability to climate change effects.
		++	Moderate Positive	The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a moderate increase in carbon sequestration. The option will generate moderate additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)
		+	Minor Positive	The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a minor increase in carbon sequestration. The option will generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)
		0	Neutral	The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.
		-	Minor Negative	The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate minor construction and/or operational carbon emissions (see carbon scale).
		--	Moderate Negative	The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate moderate construction and/or operational carbon emissions (see carbon scale). The option will result in a moderate release of previously sequestered carbon.
		---	Major Negative	The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate significant construction and/or operational carbon emissions (see carbon scale). The option will result in a major release of previously sequestered carbon.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Landscape: Conserve, protect and enhance landscape, townscape and seascape	Areas of Outstanding Natural Beauty National Character Areas Green Belt land National Park	+++	Major Positive	The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	The option would have a moderate positive contribution to designated landscape management plan objectives The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive	The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	The option would not result in any effects on the local landscape, townscape or seascape.
		-	Minor Negative	The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
		--	Moderate Negative	The option would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
		---	Major Negative	The option would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.

Historic Environment Conserve, protect and enhance the historic environment, including archaeology	Listed buildings: - Grade I listed structures - Grade II* listed structures - Grade II listed structures Registered Parks and Gardens: - Grade I Registered Parks and Gardens - Grade II* Registered Parks and Gardens - Grade II Registered Parks and Gardens Protected Wrecks Registered Battlefields Scheduled Monuments Conservation Areas World Heritage Sites	+++	Major Positive	The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as: - Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register; - Improving interpretation and public access to important heritage assets.
		++	Moderate Positive	The option will result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.
		+	Minor Positive	The option will result in enhancements to non-designated heritage assets and/or their setting.
		0	Neutral	The option will have no effect on cultural heritage assets or archaeology.
		-	Minor Negative	The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. There will be limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		--	Moderate Negative	The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. The option will diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.
		---	Major Negative	The option will diminish the significance of designated heritage assets and/or their setting such as: - Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register. - Loss of public access to important heritage assets and lack of appropriate interpretation. - There will be major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Population, Human Health Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing Maintain and enhance tourism and recreation	Noise action important area Indices of Multiple Deprivation 2015 Functional site: - Schools - Medical facilities OS Greenspace dataset: - Allotments - Bowling green - Cemetery - Golf course - Sports facility - Play space - Playing field	+++	Major Positive	The option leads to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		++	Moderate Positive	The option leads to positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area
		+	Minor Positive	The option has a temporary positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.
		0	Neutral	The option would not result in any effects on human health and existing recreational facilities and/or tourism.
		-	Minor Negative	The option has a temporary effect on human health (e.g. noise or air quality). The option reduces the availability and quality of existing recreational facilities and/or tourism within the operational area.
		--	Moderate Negative	The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		---	Major Negative	The option has a significant long-term effect on human health (e.g. noise or air quality). The option results in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Material Assets Minimise resource use and waste production Avoid negative effects on built assets and infrastructure	Transport: - Major roads – A roads - Major roads motorway - Railway line - National cycle route - National trails	+++	Major Positive	The option will re-use or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 100% renewable sources. The option improves national cycle routes or national trails.
		++	Moderate Positive	The option will re-use or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 90% renewable sources. The option improves national cycle routes or national trails.
		+	Minor Positive	The option will re-use or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 80% renewable sources. The option improves national cycle routes or national trails.
		0	Neutral	The option would not result in any effects on material assets.
		-	Minor Negative	The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. There are limited opportunities for sustainable design or the use of sustainable materials. The option results in a minor increase in energy consumption with no renewable energy options. The option results in a minor disruption on built assets and infrastructure, including transport.
		--	Moderate Negative	The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. The option results in a moderate increase in energy consumption with no renewable energy options. The option results in a moderate disruption on built assets and infrastructure, including transport links.
		---	Major Negative	The option will require significant new infrastructure that cannot be provided through the re-use or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials. The option results in a major increase in energy consumption with no renewable energy options. The option results in a major distribution on built assets and infrastructure, including transport links.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.

Assessment Cover Information	
Option Name	Lower Thames Reservoir (LTR)
Water company	Thames Water and Affinity Water
Option Description	A connection into the existing Wraysbury tunnel at the existing Iver Water Treatment Works (WTW) and a new raw water pumping station. A new pipeline would transfer raw water from the new raw water pumping station at Iver WTW to a new proposed WTW (exact location to be determined). A new transfer pipeline would carry clean water from the new WTW to an existing service reservoir in the vicinity of Harefield.

SEA Topic	SEA Objective	Construction Effects		Operational Effects		Comment	Mitigation	Residual Construction		Residual Operational	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	--	+	-	Mid Colne Valley Site of Special Scientific Interest (SSSI) (95.28% favourable, 4.72% unfavourable - declining) and Groundwater Dependent Terrestrial Ecosystem (GWDTE); Fray's Farm Meadows SSSI (53.30% favourable, 46.70% unfavourable - declining) and GWDTE, and Frays Valley Local Nature Reserve (LNR); Denham Lock Wood SSSI (100.00% favourable) and GWDTE; Denham Quarry Park LNR; and Kingcup Meadows & Oldhouse Wood SSSI (27.55% favourable, 72.45% unfavourable - recovering) and GWDTE are all within 500m of the option route. Ruislip Woods SSSI and GWDTE; Old Park Wood SSSI and GWDTE; and Northmoor Hill Wood LNR are all within 2000m. There is potential for disturbance to these sites during the construction phase. The option is within SSSI Impact Risk Zones. The option passes through woodland and priority habitat therefore potential for direct effects. There are areas of ancient woodland within 500m, however no effects anticipated. The pipeline crosses chalk rivers, however no impacts anticipated due to use of trenchless techniques under rivers. Construction works at the Wraysbury Tunnel Connection have the potential to impact protected species and their habitat (through habitat loss and disturbance effects) at the connection point which consists of amenity grassland, surrounded by hardstanding and buildings, and within close proximity to an area of broadleaved woodland and both ponds and running water. During operation, impacts are likely to be low with some disturbance during maintenance activities. Construction of the Raw Water Transfer Main has the potential to impact protected species along the length of the corridor through habitat loss and disturbance effects. During operation, impacts are likely to be low with some disturbance during maintenance activities. Construction of the new WTW has the potential to impact protected species at and connected to the site. During operation, the new WTW would potentially increase lighting to the surrounding habitats, with exterior lights being installed. There would also be a potential increase in noise and disturbance to the surrounding habitats. The Drinking Water Transfer Route Corridor is within close proximity to Ruislip Woods SSSI, Fray's Farm Meadow SSSI and Frays Valley LNR, and crosses the London's Canals Site of Importance for Nature Conservation (SINC), Southlands Manor Local Wildlife Site (LWS), Mid Colne SINC, Shepherd's Hill Woods and Fields SINC and Newyears Green SINC. Any vegetation removal during the construction phase could potentially have a negative impact on these sites. Disturbance due to excessive noise, vibration, lighting and the presence of people, and pollution events could also adversely affect these habitats. Works to construct the Drinking Water Transfer Main have the potential to impact protected species along the length of the route corridor. During operation, impacts are likely to be low with some disturbance during maintenance activities. The Harefield Service Reservoir Connection is immediately adjacent to the Shepherd's Hill Woods and Fields SINC, which is cited for its thick inter-connecting hedges and ancient woodland indicators, with potential negative impacts via disturbance during construction works for the Harefield Service Reservoir Connection. Construction works have the potential to impact protected species within the existing Harefield Service Reservoir site. During operation impacts are likely to be low with some disturbance during maintenance activities. The Environmental Appraisal Report (EAR) (2022) states that during construction, there is a risk of construction related impacts on the aquatic communities. The construction related impacts include localised impacts on water quality due to increased sediment loads and/or pollution incidents. Temporary disturbance of fish communities. Overall, the aquatic communities associated with the construction activities are considered to be tolerant and impacts are considered temporary and reversible. Any impacts on the aquatic communities are therefore expected to be short term with, no or negligible change in aquatic ecological community receptors are expected. Based on currently available information, the majority of identified operational effects on the aquatic environment are considered likely to be either negligible or result in minor adverse or minor beneficial effects that are unlikely to affect the overall ecological integrity of affected reaches. Identified adverse effects with risks to the overall ecological integrity of during operation of the Lower Thames Reservoir Option include potential primary productivity/food-chain effects within the River Thames, upstream of the abstraction point for the Lower Thames Reservoir Option. Flow changes within the River Thames as a result of the South East Reservoir Option (SESRO) SRO have the potential to be both beneficial and adverse (at different times and for different species) for the existing baseline ecology and may affect the overall ecological integrity of the affected reaches. The Habitats Regulations Assessment (HRA) Test of Likely Significance (ToLS) and Appropriate Assessment (AA) has been undertaken as part of the Gate 2 process. The ToLS (2022) identified no likely significant effects (LSE) for Windsor Forest & Great Park SAC and Burnham Beeches SAC. However, the potential for LSE were identified for the South West London Waterbodies SPA and Ramsar therefore AA was undertaken. The AA identified no adverse effects on the integrity of the sites with the implementation of mitigation measures, with no residual effects identified. The risk for the transfer / spread of invasive and non-native species is anticipated to be low given the raw water would be treated at the new WTW before storage within the closed service reservoir. However, any leaks of raw water prior to treatment could affect surrounding habitat.	Best practice methods to be implemented to minimise disturbance effects and habitat loss including refining pipeline alignment to avoid sensitive habitats. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design would need to undertake ecology surveys. Ecological Method Statements and in person Ecological Clerk of Works surveys for operational effects. Implement mitigation set out in the HRA to avoid adverse effects. Further consider impacts on aquatic ecology as the design progresses. Review the HRA as the design progresses at subsequent project stages. Investigate opportunities for nature based solutions and Biodiversity Net Gain such as creation of high value habitat, habitat creation or improvement works within habitat network zones to support nature recovery network and create wildlife corridors.	0	-	+	-
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	The option passes through Grade 3 and land classed as urban and non-agricultural. There is potential for disturbance to these soils during the construction phase. The LTR EAR (2022) identifies that some area of the pipeline route are classified as Grade 2 and 3a and 4 where detailed Agricultural Land Classification (ALC) survey information is available. Note that the provisional ALC data does not subdivide Grade 3 into 3a (representing best and most versatile land) and 3b (not presenting best and most versatile land). Where detailed ALC survey is available, some areas of the Drinking Water Transfer Main Route Corridor have been classified as Grade 2 and 3a (in the New Denham area between the M25 and M40) and 4 (in the southern section of the route corridor immediately east of the M25). There is potential for total land take of 47ha for agricultural land with 2ha in Grade 2, 44.5ha in Grade 3 and 0.5ha in Grade 3b. There is not anticipated to be a loss of soil as a result of the WTW given it is indicatively located on an existing industrial site. The option passes through historic landfill sites and there are also historic and authorised landfill sites within close proximity. An existing operational landfill site (Land at Denham, Uxbridge and an unnamed landfill) is within the option corridor, Cliffeville Landfill. There is potential for the construction phase to disturb contaminants.	Reinstate land following construction. Implement best practice construction methods for working within proximity to landfill sites. Undertake a detailed soil survey and/or agricultural land survey to inform the development and implementation of a Soil Management Plan.	0	-	0	0
Water	Increase resilience and reduce flood risk	0	--	0	-	The option is predominately within Flood Zone 1, however there are areas of Flood Zone 2 and 3 which the option passes through. There is potential for the construction phase to be at risk of flooding. The indicative location of the new pumping station and new WTW is identified to be within Flood Zone 1. The LTR EAR (2022) identifies that a small proportion of the Indicative WTW Site has a high surface water flood risk and therefore potential for construction and operational risks. Operational risks are not anticipated for the pipeline given it would be buried.	Implement methods during the construction phase to reduce flood risk, however residual risk remains. Undertake a drainage assessment of the Indicative WTW Site and determine current drainage capabilities against surface water flood risk and implement appropriate drainage, including Sustainable Drainage Systems (SuDS), to remove risk of surface water flooding.	0	-	0	0
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	The option is within proximity to waterbodies and crosses main rivers. The construction phase has the potential to lead to the contamination of the water environment. The option is within the Lower Thames Gravels, Radlett Tertiaries and the Mid-Chilterns Chalk WFD groundwater bodies. The LTR EAR (2022) identifies that to the north of Ickenham, the Drinking Water Transfer Main Route Corridor passes through areas defined as Source Protection Zone 1 (SPZ1) and SPZ2. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment would be required for works within SPZ1 or 2. The Water Framework Directive (WFD) Level 1 Assessment identified that further WFD assessment would be required for one surface water river (the Thames (Cookham to Egham) and two WFD lakes (Queen Mother Reservoir and Wraysbury Reservoir). The WFD Level 2 Assessment was therefore undertaken and it was identified the impacts associated with this option do not have the potential to deteriorate the WFD element status' or prevent the attainment of Good in the future. This option is, therefore, considered to be compliant with the WFD at this stage.	Best practice mitigation measures likely to be implemented during construction. It is recommended that, following the identification of the preferred option and the development of a detailed design solution, more detailed assessment be carried out on the potential impacts on the WFD. Undertake hydrogeological risk assessment for works within SPZ1 or 2, then implement additional mitigation as required. Residual risk remains given hydrological assessment is still to be carried out.	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	The option is likely to increase the resilience of supplies through the transfer of water across regions.	N/A	0	0	+++	0
Air	Reduce and minimise air emissions	0	--	0	0	The option passes through London Borough of Hillingdon Air Quality Management Area (AQMA), South Bucks AQMA and South Bucks District Council No.1 AQMA. The construction phase is likely to lead to effects on local air quality. There may be some operational effects associated with the new WTW, however this is anticipated to be negligible. The LTR EAR (2022) identifies that the annual mean nitrogen dioxide (NO_2) objective may be exceeded in regions of the option that are located close to the roadside within South Bucks District Council AQMA No. 2 AMQA. Exceedances of the NO_2 objectives are unlikely to occur in suburban and urban background locations, where the majority of the option is located. Exceedances of the particulate matter (PM_{10} and $PM_{2.5}$) objectives are not expected to occur in any location. There are sensitive human and ecological receptors within 350m of the Lower Thames Reservoir Option which could be impacted as a result of construction activities.	Best practice mitigation measures implemented during construction such as communication and site management, monitoring, preparing and maintaining the site. However, minor and temporary impacts on air quality may remain.	0	-	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	0	--	The Carbon Strategy Report (Technical Supporting Document A3) provides information on estimated capital and operational carbon impacts and whole life carbon emissions (including changes to carbon sequestration as a result of permanent and temporary land use change, based upon the results of the natural capital assessment undertaken and reported in the EAR). Based upon this information, the option is estimated to have minor construction and moderate operational emissions. Carbon would be generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation (e.g. WTW, pumping stations). Land use change represented c.1% of the whole life carbon emissions.	As outlined in the Carbon Strategy Report, capital carbon mitigation through material selection, optimising the design of WTW processes to reduce use of high carbon materials, reducing pipe size diameter, consideration given to not installing dual tunnels at every trenchless crossing, reviewing backfill and reinstatement, to reduce the amount of imported material required, consideration given to single rather than dual supply for pumping stations and waste minimisation. Reducing operational carbon at carbon hotspot areas such as optimising energy efficiency and maintenance activities to prolong asset life/ performance, low carbon power generation and decarbonised electricity procurement choices and renewable energy generation.	0	-	0	--
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	The option involves the abstraction of raw water from the Wraysbury and Queen Mother Reservoirs. During operation, the option therefore has the potential to have an effect on water levels and therefore effecting the resilience of the local environment to climate change.	Monitor water levels.	0	0	0	-

SEA Topic	SEA Objective	Construction Effects +	Construction Effects -	Operational Effects +	Operational Effects -	Comment	Mitigation	Residual Construction +	Residual Construction -	Residual Operational +	Residual Operational -
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	The option is within the London Area Greenbelt and the Thames Valley National Character Area. There is likely to be minor effects on the landscape during the construction phase. The LTR EAR (2022) identified the potential for the loss of vegetation which is of particular concern along watercourses, field boundaries and where vegetation has a screening effect. There is also potential for permanent loss of vegetation and may lead to a permanent change to the landscape. Perceptual and experiential value may be adversely affected in the vicinity of public rights of way (PRoWs) and residential properties as a result of the presence of construction activity which may result in a reduction in tranquillity of the landscape. There is potential effect on land use during the works where the generally flat low-lying recreational landscape of the River Colne would be affected by large scale excavation and stockpiling. There is potential for effects on the landscape associated with the new WTW. However, the indicative location is north of the existing Iver WTW on an existing industrial site therefore effects anticipated to be negligible.	Refinement of construction corridor and location of above ground structures to reduce vegetation loss. Best practice measures would likely be implemented to minimise effects during construction such strategic planting and other landscaping between to soften the visual impact, however minor and temporary impacts may remain. Land reinstated upon completion where reasonably practicable.	0	-	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	Grade II Listed Building (Iver Court Farmhouse) is located within the indicative boundary of the new WTW site and the LTR EAR (2022) adds that depending on the layout for the WTW site, the construction phase has the potential to directly impact the asset through loss of fabric. Operational effects are not anticipated for this asset given it is already surrounded by industrial uses. There are listed buildings, a scheduled monument and conservation areas within 500m of the option route. There are also additional historic assets within 2km. The construction activities have the potential to temporarily alter the settings of the Brackenbury Farm moated site 3/4 mile (1210m) NW of Ickenham church Scheduled Monument, and the other listed buildings and conservation areas assets through noise, visual and light intrusion. The excavation required for the option could impact archaeology, if present.	Best practice measures would likely be implemented to minimise setting effects during construction. -Consideration of the listed building within the design of the new WTW. Strategic planting and other landscaping between the Indicative WTW Site and designated assets may soften the visual impact, especially in conjunction with design measures for the buildings. Further work likely to be required to determine significance of effect, depending on the presence or absence of buried archaeology. Residual effects may remain due to potential loss of archaeological remains due to construction.	0	-	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	0	The pipeline passes through a golf course and noise action planning important areas. The option is within 500m of country parks, public parks or gardens, allotments, churches and religious grounds, schools, golf courses and other community facilities. There is potential for the construction phase of the Treated Water Transfer Main Route Corridor to lead to disturbance effects for the local community and users of these facilities. The LTR EAR (2022) states that, depending on the construction methodology, there may be a change in environmental conditions within communities within 500m of the Drinking Water Transfer Main Route Corridor as a result of a combination of noise, air quality, visual impacts or presence of HGV vehicles. The LTR EAR (2022) identifies that the Harefield Service Reservoir Connection, Wraysbury Tunnel Connection, Raw Water Transfer Main Route Corridor and Indicative WTW Site are not anticipated to directly affect housing, private property, businesses, community facilities or areas of open space and recreation during construction. Temporary amenity impacts on residential receptors as a result of changes in environmental conditions are not anticipated due to the distance of these receptors from construction works. The LTR EAR (2022) identified the potential for minor noise related effects during the construction phase and there is also potential for operational effects from pipeline operation or ancillary pumping station, however this is dependent on the location of these assets and since the main corridors are located away from sensitive receptors, it is unlikely that there would be any noise impacts. IMD deciles range from 4 to 9 along the option.	Setting out how engagement with local communities would be undertaken during construction, including with the golf course should temporary land acquisition and closure of parts of the golf course be required during construction. Best practice mitigation measures e.g. community engagement, air quality management, noise management to be implemented to minimise effects during construction. The above ground assets should have landscaping, air quality and noise mitigation included in their design, in order to limit the potential indirect impacts from noise and air pollution on properties. However, minor and temporary effects are likely to still occur.	0	-	0	0
	Maintain and enhance tourism and recreation	0	--	0	-	The proposed pipeline passes through a golf course and is within 500m of country parks, public parks and gardens, allotments and other recreational facilities. It also intersects national cycle routes and the potential to lead to disruption for PRoW during the construction phase. The LTR EAR (2022) identified that the Treated Water Transfer Main Route Corridor, Wraysbury Tunnel Connection, Raw Water Transfer Main Route Corridor, Indicative WTW Site and Harefield Service Reservoir Connection all have the potential to affect recreational routes and facilities given the proximity and there may be temporary effects from a change in amenity. Depending on the design of the water treatment plant there may be a change in environmental conditions during operation for open spaces and recreation surrounding the proposed locations as a result of a combination of noise, air quality, visual impacts or presence of HGV vehicles.	Best practice mitigation measures to be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur. Setting out how engagement with local communities would be undertaken during construction, including with the golf course should temporary land acquisition and closure of parts of the golf course be required during construction. Review design of the new WTW to avoid changes to environmental conditions for open spaces. The above ground assets should have landscaping, air quality and noise mitigation included in their design, in order to limit the potential indirect impacts from noise and air pollution. Maintenance or diversion of key routes used by the community such as footpaths and pedestrian and cycling routes.	0	-	0	-
Material Assets	Minimise resource use and waste production	0	-	0	0	New infrastructure required for this option would use materials and generate waste, including excavated material.	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material where reasonably practicable to reduce the impact, however it is likely that minor negative effects would remain.	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	The option cross major roads, HS2 railway, Grand Union Canal and national cycle routes. There is potential for disruption to these assets during the construction phase. The LTR EAR (2022) identified that construction related movements would not place additional constraints on the road network, however further assessment is required. The LTR EAR (2022) identified that there are five power line assets present across the sections within the study area and may present potential safety hazards as well as power outage and damaged cables depending on the height of machinery required during the construction phase.	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction. Maintenance or diversion of key routes used by the community such as footpaths and pedestrian and cycling routes. However, minor and temporary effects are likely to still occur. Trenchless techniques under the railway and major roads is likely to be required.	0	-	0	0
	SEA Metrics	Positive	9					Positive	9		
		Negative	-44					Negative	-19		

Assessment Cover Information	
WRSE Option ID	
Option Name	Beckton Reuse Indirect (BRI)
Water company	Thames Water and Affinity Water
Option Description	The key components of the scheme include an intake on the River Lee and raw water pumping station. A raw water transfer pipeline to a new Water Treatment Works (WTW) (indicative location) and then a new drinking water transfer pipeline from the new WTW to a service reservoir in the vicinity of Brookmans Park, and a drinking water transfer pipeline from a service reservoir in the vicinity of Brookmans Park to an existing booster pumping station in the vicinity of North Mymms.
WRZ	

SEA Topic	SEA Objective	Construction Effects		Operational Effects		Comment	Mitigation	Residual Construction Effects		Residual Operational Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	-	The Indicative Intake Location on the River Lee is within the Chingford Reservoirs Site of Special Scientific Interest (SSSI) (100.00% favourable) therefore potential for direct effects during the construction phase. The EAR (2022) notes that the negative impacts on the SSSI could occur via lighting and noise disturbance during the construction phase. The EAR identifies that the construction phase of the Drinking Water Transfer Main Route Corridor has the potential to indirectly affect Wormley-Hoddesdonpark Wood South SSSI (100.00% favourable) and Wormley-Hoddesdonpark Woods Special Area of Conservation (SAC) (which encompasses Broxbourne Woods NNR). The Habitats Regulations Assessment (HRA) Appropriate Assessment (AA) identified no adverse effects on the integrity of the sites where appropriate mitigation is implemented, with no residual effects anticipated. Construction work could negatively impact upon the Northaw Great Wood SSSI (12.25% favourable, 87.75% unfavourable - recovering) and Northaw Great Wood Country Park Local Nature Reserve (LNR), including the diverse breeding bird community that they support, due for example to loss of supporting habitat, disturbance due to noise, vibration light and presence of people. Water End Swallow Holes SSSI (100.00% favourable) is located to the west of the Drinking Water Transfer Main to North Mymms Route Corridor therefore construction works have the potential to negatively impact the statutory designated site. Below ground structures would be constructed such that they would not form a preferential pathway for pollution to groundwater or cause alterations in groundwater flow or levels. Epping Forest SSSI, SAC and Ground Water Dependent Terrestrial Ecosystem (GWDTE); Cornmill Stream and Old River Lea SSSI and GWDTE; Waltham Abbey SSSI and GWDTE; Lee Valley SPA and Ramsar; Turnford & Cheshunt Pits SSSI; and Furzefield Wood & Lower Halfpenny Bottom LNR are within 2000m. The option is within SSSI Impact Risk Zones. There is ancient woodland within 500m and the EAR notes that there are potential construction impacts on areas of ancient woodland adjacent to the Drinking Water Transfer Main to North Mymms Route Corridor (including Brick Kiln Wood and Peplin's Wood). The option passes through woodland and priority habitat therefore potential for direct effects from construction. The EAR also notes that the construction of the option has the potential to impact priority habitat and protected species. There is not anticipated to be any effects on chalk rivers. During operation, the Raw Water Pumping Station and new WTW would potentially increase lighting to the surrounding habitats, with exterior lights being installed. This could have adverse effects on crepuscular and nocturnal species, for example bats, barn owl, etc. There would also be a potential increase in noise and disturbance to the surrounding habitats. Operational effects from the Brookmans Park Service Reservoir Connection are not anticipated. The operation of the Raw Water Transfer Main; Drinking Water Transfer Main; Drinking Water Transfer Main to North Mymms; and North Mymms Booster Station Connection is likely to be low and any effects from planned maintenance or replacement would likely be highly localised. The HRA Test of Likely Significance (ToLS) and AA has been undertaken as part of the Gate 2 process. The ToLS (2022) identified the potential for likely significant effects on the Lee Valley SPA and Ramsar site and Wormley-Hoddesdonpark Woods SAC as a result of the construction phase and AA was therefore undertaken. The AA identified no significant adverse effects on the integrity of the sites where appropriate mitigation is implemented. The EAR (2022) states that the assessment of effects associated with recycled water being fed into the river, and the associated abstraction, will be assessed as part of the London Reuse SRO assessments. As such, only the construction related activities were assessed in relation to aquatic ecology in the EAR. During construction there is a risk of impacts on the aquatic communities. The risk relates to construction impacts such as pollution incidents, local increases in sediment/siltation, temporary disturbance as a result of noise and vibration. During operation, backflushing or 'airburst' may be required for maintenance of the intake. Such 'airburst' could result in localised impacts on water quality through the re-suspension of fine material and water quality impacts where water may have become stagnant within the intake pipe. The aquatic communities are considered to be tolerant and any impacts on the aquatic communities are therefore expected to be temporary and reversible. As such, no or negligible change in aquatic ecological community receptors are expected. The risk for the transfer / spread of invasive and non-native species (INNS) is anticipated to be low given it would abstracted and would be treated at the new WTW before being stored at a service reservoir in the vicinity of Brookmans Park.	Route pipeline to avoid impacts on areas of ancient woodland. Ensure monitoring is carried out and appropriate mitigation measures are implemented at the intake at the Chingford Reservoirs SSSI. Best practice methods to be implemented to minimise disturbance effects and habitat loss including refining pipeline alignment to avoid sensitive habitats. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design would need to undertake ecology. Ecological Method Statements and Ecological Clerk of Works surveys for operational effects. Implement mitigation set out in the HRA to avoid significant effects. Review the HRA as the design progresses at subsequent project stages. Investigate opportunities for nature based solutions and biodiversity net gain such as creation of high value habitat, habitat creation or improvement works within habitat network zones to support nature recovery network and create wildlife corridors.	0	--	0	-
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	The option passes through Grade 3, as well as land classed urban and non-agricultural. The construction phase is likely to result in disturbance to these soils. The Indicative Intake Location, Indicative Raw Water Pumping Station Site and Indicative WTW Site are on land classed as Grade 3 therefore potential permanent loss of land. Note that the provisional ALC data does not subdivide Grade 3 into 3a (representing best and most versatile land) and 3b (not presenting best and most versatile land). The EAR (2022) identifies that where detailed ALC survey is available, some areas of the Drinking Water Transfer Main Route Corridor have been classified as Grade 3b (in the northern section of the route corridor between Goffs Oak and the Brookmans Park Service Reservoir Connection). It is also stated in the EAR that the option would result in total 128.3ha of land take in agricultural land with 124.8ha and 3.5ha in Grade 3 and 3b respectively. Water End Swallow Holes SSSI and Castle Lime Works Quarry SSSI (geological SSSIs) are within 2000m, however no effects anticipated. The option passes through historic landfill sites and there are other historic landfill sites within 500m therefore the construction phase has the potential to disturb contaminants.	Reinstate land following construction, however there would be some permanent loss. Implement best practice construction methods for working within proximity to landfill sites. Undertake a detailed soil survey and/or agricultural land survey to inform the development and implementation of a Soil Management Plan.	0	-	0	0
Water	Increase resilience and reduce flood risk	0	--	0	--	The option is predominately within Flood Zone 1, however there are areas of Flood Zone 2 and 3 which the option passes through. There is potential for the construction phase to be at risk of flooding. The EAR (2022) identifies that the Indicative WTW Site is within Flood Zone 1. The Indicative Intake Location, Indicative Raw Water Pumping Station Site and parts of the Raw Water Transfer Main Route Corridor, Drinking Water Transfer Main Route Corridor and Drinking Water Transfer Main to North Mymms Route Corridor are within Flood Zones 2 and 3 and therefore are at risk of flooding. The pipeline would be buried therefore operational risks not anticipated, however the other assets may be at risk during the operational phase.	Implement methods during the construction phase to reduce flood risk, however residual risk remains.	0	-	0	-
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	The option is within proximity to waterbodies and crosses main rivers. The construction phase has the potential to lead to the contamination of the water environment. The option is within the Radlett Tertiaries and the Mid-Chilterns Chalk Water Framework Directive (WFD) groundwater bodies. The EAR (2022) identifies that the Indicative Intake Location and Indicative Raw Water Pumping Station Site, Drinking Water Transfer Main Route Corridor, Drinking Water Transfer Main to North Mymms Route Corridor and North Mymms Booster Station Connection are located within areas defined as Source Protection Zone 1 (SPZ1) and SPZ2. The Raw Water Transfer Main Route Corridor is within SPZ2. The Indicative WTW Site and Brookmans Park Service Reservoir Connection are not located within SPZs. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment would be required for works within SPZ1 or 2. There is potential for operational effects on the water environment given the option involves abstraction from the River Lee which could impact water quality, flows and levels. The WFD Level 1 Assessment identified that further WFD assessment would be required for one surface water body (Lea Navigation Enfield Lock to Tottenham Locks). The WFD Level 2 Assessment was therefore undertaken and identified that impacts associated with the new or increased surface water abstraction activity does not have the potential to deteriorate the WFD elements of the Lea Navigation Enfield Lock to Tottenham Locks water body or prevent them from attaining Good status. Therefore, at this stage, the option is considered to be compliant with the WFD.	Best practice mitigation measures likely to be implemented during construction. It is recommended that, following the identification of the preferred option and the development of a detailed design solution, more detailed assessment be carried out on the potential impacts on the WFD. Undertake hydrogeological risk assessment for works within SPZ1 or 2, then implement additional mitigation as required. Residual risk remains given hydrological assessment is still to be carried out.	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	The option is likely to increase the resilience of supplies through the transfer of water across regions.	N/A	0	0	+++	0
Air	Reduce and minimise air emissions	0	--	0	0	The option passes through the Enfield Air Quality Management Area (AQMA) which was declared for exceedances of the annual mean nitrogen dioxide (NO_2) and 24-hour mean PM10 (particulate matte) objectives. However, the EAR (2022) identifies that the option is not expected to have a significant impact on air quality in these regions, as construction and operational vehicle flows are unlikely to be above the screening threshold of 100 HDVs and/or 500 LDVs. Further to this, exceedances of the NO_2 objectives are unlikely to occur in suburban and urban background locations, where the Indicative Intake Location, Indicative Raw Water Pumping Station Site, Indicative WTW Site, Raw Water Transfer Main Route Corridor and majority of the Drinking Water Transfer Main Route Corridors are located. The EAR identifies that the exceedances of PM_{10} and $PM_{2.5}$ objectives are not expected to occur in any location. However, there may be some minor air quality effects during construction associated with dust. There may be some operational effects associated with the new WTW, however this is anticipated to be negligible therefore neutral effects identified. There are sensitive human and ecological receptors within 350m of the option which could be impacted as a result of construction activities.	Best practice mitigation measures implemented during construction such as communication and site management, monitoring, preparing and maintaining the site. However, minor and temporary impacts on air quality may remain.	0	-	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	0	--	The Carbon Strategy Report (Technical Supporting Document A3) provides information on estimated capital and operational carbon impacts and whole life carbon emissions (including changes to carbon sequestration as a result of permanent and temporary land use change, based upon the results of the natural capital assessment undertaken and reported in the EAR). Based upon this information, the option is estimated to have minor construction and moderate operational emissions. Carbon would be generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation (e.g. WTW, pumping stations). Land use change represented c.1% of the whole life carbon emissions.	As outlined in the Carbon Strategy Report, capital carbon mitigation through material selection, optimising the design of WTW processes to reduce use of high carbon materials, reducing pipe size diameter, consideration given to not installing dual tunnels at every trenchless crossing, reviewing backfill and reinstatement, to reduce the amount of imported material required, consideration given to single rather than dual supply for pumping stations and waste minimisation. Reducing operational carbon at carbon hotspot areas such as optimising energy efficiency and maintenance activities to prolong asset life/ performance, low carbon power generation and decarbonised electricity procurement choices and renewable energy generation.	0	-	0	--
	Reduce vulnerability to climate change risks and hazards	0	0	0	-	The option has the potential to affect the resilience of the local environment to climate change as it involves abstracting water.	Monitor river levels and flows and implement appropriate mitigation if required.	0	0	0	-

SEA Topic	SEA Objective	Construction Effects		Operational Effects		Comment	Mitigation	Residual Construction Effects		Residual Operational Effects	
		+	-	+	-			+	-	+	-
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	-	0	0	The option is within the London Area Greenbelt and Northern Thames Basin National Character Area. There is likely to be minor effects on the landscape during the construction phase. There is potential for effects on the landscape associated with the Raw Water Pumping Station as it is indicatively located on a greenfield site. The new WTW is indicatively located on a site which is partly developed. There is potential for a permanent change in the landscape. The EAR (2022) notes that during construction there is likely to be a reduction in landcover value from vegetation removal, change to landscape character in proximity to the River Lee, change to the setting of the landscape, reduction in tranquillity, changes to the undeveloped character of the greenbelt and loss of open land within the greenbelt, changes to the structure of the landscape, effects on the views. The land which is disturbed as part of the pipeline aspects of the option would be reinstated following construction.	Best practice measures would likely be implemented to minimise effects during construction and operation such strategic planting and other landscaping between to soften the visual impact, however minor and temporary impacts may remain at the construction phase. Adjust pipeline route to avoid vegetation removal, retain vegetation where reasonably practicable and replace removed vegetation, and avoid construction of permanent structures on undeveloped land. Land reinstated upon completion where reasonably practicable.	0	-	0	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	-	There are listed buildings, two Registered Parks and Gardens, and three scheduled monuments including, Elsyng Palace, World War II Heavy Anti-aircraft gunsite at Burnt Farm Camp, and Coldharbour Moat, within 500m of the option route. There are also other heritage assets within 2000m. The setting of these assets has the potential to be affected during the construction phase. It is noted in the EAR (2022) that the River Lee Intake and Raw Water Pumping Station could affect the setting of Luthers Grade II* Listed Building through noise, visual and light intrusion during construction. The EAR also identifies the potential for very minor changes to the setting of the Grade II listed Netherhouse Farmhouse as a result of the construction phase of the new WTW through noise intrusion caused by construction activities. The Drinking Water Transfer Main Route Corridor has the potential to temporarily alter the settings of listed buildings, Registered Parks and Gardens and Scheduled Monuments through noise, visual and light intrusion, particularly those that are intervisible with the Drinking Water Transfer Main Route Corridor. It passes through Forty Hill Conservation Area and Turkey Street Conservation Area, as designated by London Borough of Enfield. Whilst nothing of historic interest relating to the conservation areas would be directly impacted during construction of the pipeline, their settings would be changed through visual and noise intrusion as a result of construction activities. The EAR also states that any above ground structures associated with the River Lee Intake and Raw Water Pumping Station, the pipelines and the new WTW have the potential to permanently and adversely alter the setting of listed buildings that are intervisible with them, through visual intrusion. No operational effects are anticipated for the North Mymms Booster Station Connection and the Brookmans Service Reservoir Connection. The excavation required for the option could impact archaeology, if present.	Best practice measures would likely be implemented to minimise setting effects during construction. Design considerations to minimise the effects on the setting of assets and could include measures such as strategic planting or other landscaping. Further work likely to be required to determine significance of effect, depending on the presence or absence of buried archaeology. Residual effects may remain due to potential loss of archaeological remains due to construction.	0	-	0	-
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	0	-	The Drinking Water Transfer Main Route Corridor passes through Gunpowder Park, which is a country park. The option is within 500m of public parks and gardens, country parks, play spaces, schools, playing fields, allotments, churches and religious grounds, golf courses, cemeteries and other community facilities. There is potential for disruption to the local community and users of these community facilities during the construction phase. The EAR (2022) identifies that the proposed pipeline runs through the grounds of a college, which may require temporary closure and/or relocation of college facilities. The EAR also states that the Indicative Intake Location and Indicative Raw Water Pumping Station Site have the potential to directly affect private property and business activities during construction. The Raw Water Transfer Main Route Corridor and the Indicative WTW Site intersect businesses and therefore both temporary and permanent acquisition of land currently used by these businesses would be required. There may be a temporary change in environmental conditions as a result of a combination of noise, air quality, visual impacts or presence of HGV vehicles during construction as a result of all aspects of the option as identified in the EAR. The EAR identifies that, depending on the design of the new WTW, there may be a change in environmental conditions during operation for residential and private properties and businesses as a result of a combination of noise, air quality, visual impacts or presence of Heavy Good Vehicles (HGVs). It is not expected that the new WTW would impact Gunpowder Park during operation. IMD deciles range from 2 to 10 along the route.	Best practice mitigation measures e.g. community engagement, air quality management, noise management to be implemented to minimise effects during construction. The above ground assets should have landscaping, air quality and noise mitigation included in their design, in order to limit the potential indirect impacts from noise and air pollution on properties. However, minor and temporary effects are likely to still occur.	0	-	0	-
	Maintain and enhance tourism and recreation	0	--	0	0	The option passes through the Gunpower Park country park, which is a country park, and is within 500m of other recreational facilities including public parks and gardens, country parks, play spaces and playing fields, allotments and golf courses. The EAR identifies that the proposed pipeline runs through sports fields and play space which may require temporary closure of the facilities and therefore construction would directly impact this facility. The EAR also identifies that the indicative WTW has the potential for effects on amenity on residential, business and open space and recreational (including Gunpowder Park) receptors as a result of changes in environmental conditions during construction. The Raw Water Transfer Main Route Corridor, Drinking Water Transfer Main Route Corridor and Drinking Water Transfer Main to North Mymms Route Corridor bisect public rights of way (PRoW). Construction may cause temporary closure and/or diversion of these PRoW as identified in the EAR. The option intersects national cycle routes and there is potential for disruption during construction. Moderate negative effects have been identified for recreation during the construction phase.	Best practice mitigation measures to be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur. Review design to avoid changes to environmental conditions for open spaces and recreation. The above ground assets should have landscaping, air quality and noise mitigation included in their design, in order to limit the potential indirect impacts from noise and air pollution. Maintenance or diversion of key routes used by the community such as footpaths and pedestrian and cycling routes.	0	-	0	0
Material Assets	Minimise resource use and waste production	0	-	0	0	New infrastructure required for this option would be use materials and generate waste, including excavated material.	Seek opportunity to implement sustainable design measures (design to reduce footprint, selection of materials) and reuse excavated material where reasonably practicable to reduce the impact, however it is likely that minor negative effects would remain.	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	The option intersects major roads, railways and national cycle routes. There is potential for disruption to these assets during the construction phase. The EAR (2022) identifies that based upon high level estimates of HGVs and staff vehicles that may be required during the construction and operational phases of the option, at this stage, it is not considered that the vehicles volumes generated would present additional constraints to the road network. The EAR (2022) identified that there are power line assets present across the sections within the study area and may present potential safety hazards as well as power outage and damaged cables depending on the height of machinery required during the construction phase. Construction activities may impact the existing Brookmans Park Service Reservoir and North Mymms booster pumping station. Temporary disturbance may occur when the pipelines are connected to these assets but disruption should be minor and short-lived. No impacts are anticipated on King George V Reservoir.	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction, selection of appropriate machinery and use of other methods where construction is in proximity to power lines. However, minor and temporary effects are likely to still occur. Trenchless techniques under the railway and major roads is likely to be required.	0	-	0	0
	SEA Metrics	Positive	8					Positive	8		
		Negative	-49					Negative	-24		

Appendix C Lower Thames Reservoir Option cumulative assessment

No.	Application Reference	Planning Authority	Application and brief description	Potential for cumulative effects with the Lower Thames Reservoir Option	Potential mitigation
1	Batchworth Golf Course, New Local Plan	Three Rivers District Council	Potential allocation 618 houses, required to provide a primary school, open space and play space	The site is located 1.3km from the where the Harefield Service Reservoir Connection. The phasing of the works of the Batchworth Golf Course allocation is six to 16 years. There is therefore potential for construction programmes to overlap with the Lower Thames Reservoir Option. If construction periods overlap then there is the potential for minor cumulative construction effects arising from visual intrusion, noise, vibration and air quality. Potential receptors include Bishops Wood Country Park (Local Wildlife Site, LWS), Batchworth Heath (LWS), BMI Bishops Wood Hospital, Mount Vernon Hospital, Michael Sobell Hospice, Bishops Wood, Woodcock Hill, Rickmansworth (open access area), DM7 Landscape Character area Landscape Region - South Herts Plateau.	Implement best practice construction methods to minimise disturbance effects. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.
2	Pre-Submission Spelthorne Local Plan 2022-2037, (ST4/009 (Elmsleigh Centre and Adjoining Land, South Street)	Spelthorne Borough Council	Site allocation for 850 residential units and retail / commercial town centre uses.	The construction period of the development has an expected overlap with the Lower Thames Reservoir Option. The site allocation is approximately 8km from the Lower Thames Reservoir Option, however, as it is within is within 3km of the South West London Waterbodies Special Protection Area (SPA) and Ramsar, cumulative effects were considered. The HRA AA conducted for the Lower Thames Reservoir Option concluded that no adverse effect to the integrity of the South West London Waterbodies Valley SPA and Ramsar are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The distance between the developments and the Lower Thames Reservoir Option are also significant enough that no other common receptors were identified with potential for cumulative effects.	N/A
3	Planning Application 2019/0215	Surrey County Council	Extraction of sand and gravel	The application is for extraction of sand and gravel that would operate over a period of 14 years and is therefore anticipated to overlap with the construction period for the Lower Thames Reservoir Option. The option is over 30km from the Lower Thames Reservoir Option, however, it is within 3km of the South West London Waterbodies SPA and Ramsar. Cumulative effects were therefore considered, however, none were identified for the construction or operational phases. The HRA Stage 2 AA did not identify any transmission pathways by which an adverse effect to the integrity of the European Sites could reasonably occur. Therefore, no adverse effects on the integrity of the European Sites are considered likely either alone or in-combination. The distance between the developments and the Lower Thames Reservoir Option are also significant enough that no other common receptors were identified with potential for cumulative effects.	N/A
4	Hybrid Bill HS2 Phase One	UK Government	HS2 Phase One - London to West Midlands	This is likely to be completed between 2029 and 2033 and is located within 1km of the Lower Thames Reservoir Option. However, development is likely to be fully built out before construction of the Lower Thames Reservoir Option commences, therefore no construction or operation cumulative effects are anticipated. This development would however need to be considered as part of a future cumulative effects assessment in terms of temporal effects, for example on local communities, and the potential deterioration of the environment as a result of successive developments.	Implement best practice construction methods to minimise disturbance effects. Undertake ecology surveys at future design stages. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.
5	Western Rail Link to Heathrow	Planning Inspectorate	Western Rail Link to Heathrow	The timing of this development is uncertain as 2018 consultation material suggests a Summer 2019 DCO application, with works due to be completed by 2027 and a new rail service operational by 2028; the Planning Inspectorate website currently states DCO application expected to be submitted in Winter 2021/2022 and the Network Rail website suggests a Winter 2022 submission. Even with a delayed submission, it is anticipated that the scheme would be fully built out and operational by 2035. It is located within 1km of the Lower Thames Reservoir Option. However, development is likely to be fully built out before construction of the Lower Thames Reservoir Option commences, therefore no construction or operation cumulative effects are anticipated. This development would however need to be considered as part of a future cumulative effects assessment in terms of temporal effects, for example on local communities, and the potential deterioration of the environment as a result of successive developments.	Implement best practice construction methods to minimise disturbance effects. Undertake ecology surveys at future design stages. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.
6	Planning Application CM/0049/21	Buckinghamshire Council	Phased extraction of an allocated sand and gravel deposit	This is an application for a phased extraction of an allocated sand and gravel deposit, including for the construction and use of a new bell mouth access off North Park. The application is awaiting a decision. The development has an estimated period of operation of seven to eight years and is therefore likely to be fully built out before construction of the Lower Thames Reservoir Option commences in 2035, however, would need to be considered as part of a future cumulative effects assessment in terms of temporal effects, for example on local communities, and the potential deterioration of the environment as a result of successive developments.	Implement best practice construction methods to minimise disturbance effects. Undertake ecology surveys at future design stages. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.
7	Buckinghamshire Minerals and Waste Local Plan	Buckinghamshire Council	M3: New Denham Quarry Extension, Allocated Site for Sand and Gravel Provision	This is an allocated site for minerals extraction and is adjacent to the Drinking Water Transfer Main Route Corridor. The plan period is up to 2036 so there could potentially be an overlap with the construction phase of the Lower Thames Reservoir option. If construction periods overlap then there is the potential for minor cumulative construction effects arising from visual intrusion, noise, vibration and air quality on the local community and other sensitive receptors. Fray's Farm Meadows SSSI and Fray's Valley LNR, and Kingcup Meadows and Oldhouse Wood SSSI, are all within 2000m of both the Drinking Water Transfer Main Route Corridor and the New Denham Quarry allocation therefore potential for cumulative indirect effects if construction periods were to overlap.	Implement best practice construction methods to minimise disturbance effects. Undertake ecology surveys at future design stages. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.
8	Buckinghamshire Minerals and Waste Local Plan	Buckinghamshire Council	M4: New Denham Quarry North West Extension, Allocated Site for Sand and Gravel Provision	This is an allocated site for minerals extraction and is adjacent to the Drinking Water Transfer Main Route Corridor. The northern extension already has a permission and the period of operation should end by 2026. If construction periods overlap then there is the potential for minor cumulative construction effects arising from visual intrusion, noise, vibration and air quality on the local community and other sensitive receptors. Fray's Farm Meadows SSSI and Fray's Valley LNR, and Kingcup Meadows and Oldhouse Wood SSSI, are all within 2000m of both the Drinking Water Transfer Main Route Corridor and the New Denham Quarry allocation therefore potential for cumulative indirect effects if construction periods were to overlap.	Implement best practice construction methods to minimise disturbance effects. Undertake ecology surveys at future design stages. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.

Appendix D Beckton Reuse Indirect Option cumulative assessment

No.	Application Reference	Planning Authority	Application and brief description	Potential for cumulative effects with the scheme	Potential mitigation
1	Policy WAL E8 – Epping Forest Local Plan (2011-2033) Submission Version	Epping Forest District Council	Land North of the A121 is a 40,000m2 employment allocation site.	The plan period for this development is up to 2038 and as such, there is potential for construction works to overlap with the construction works associated with the Beckton Reuse Indirect scheme. The allocated area is under 500m from the Beckton Reuse Indirect Option. During the construction period, depending on the timings of construction there is potential for cumulative effects from noise, dust, light and vibration pollution on the following designated sites: Cornmill Stream and Old River Lea Site of Special Scientific Interest (SSSI), Turnford & Cheshunt Pits SSSI, Epping Forest Special Area of Conservation (SAC), Epping Forest SSSI, Lee Valley Special Protection Area (SPA) and Lee Valley Ramsar. The Habitats Regulations Assessment (HRA) Stage 1 Screening Assessment for the Beckton Reuse Indirect Option identified no Likely Significant Effects (LSE) for the Epping Forest SAC and LSE for the Lee Valley SPA and Ramsar site. There is a potential for adverse effects on the Lee Valley SPA and Lee Valley Ramsar site as a result of their close proximity to the construction pipeline corridor and abstraction point on the River Lee and as a result of disturbance (noise, light, dust pollution) during construction on qualifying species. The HRA Stage 2 Appropriate Assessment (AA) identified transmission pathways but concluded that no adverse effects on the integrity of the Lee Valley SPA an Ramsar are likely if the suggested mitigation measures are implemented, with no residual effects expected. During construction, there is the potential for temporary cumulative effects to the local community from noise and air pollution as well as effects on access to facilities, potential receptors include King Harold School and Abbey garden and residential areas in Waltham Abbey. There is potential for cumulative effects on Source Protection Zones (SPZs) resulting from construction with both developments intersecting the same SPZ. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the scheme. There is potential for cumulative impacts on traffic should construction periods overlap.	Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys at future design stages. Implement mitigation as set out in the informal HRA (Technical Supporting Document B2, Habitats Regulations Assessment). Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Under the guidance of the Epping Forest District Council (EFDC) (2015) (as lead local flood authority) displacement of surface water flood risk needs to be managed. It is also advised that for development over 235m² of impermeable area, a full Flood Risk Assessment (FRA) would need to be submitted along with details of the proposed surface water management strategy. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2. Traffic management plan to be approved by regulators prior to construction.
2	Waltham Abbey North Masterplan – Policies WAL T1, R1, R2 & R3 – Epping Forest Local plan (2011-2033) Submission Version	Epping Forest District Council	Waltham Abbey North Masterplan Area is allocated to accommodate 612 homes.	The plan period for this development is up to 2038 and, as such, there is potential for construction works to overlap with the construction works associated with the Beckton Reuse Indirect Option. The masterplan area is approximately 2km from the Beckton Reuse Indirect Option. During the construction period, depending on the timings of construction, there is potential for cumulative effects from noise, dust, light and vibration pollution on the following designated sites: Lee Valley SPA, Lee Valley Ramsar, Cornmill Stream and Old River Lea SSSI; Waltham Abbey SSSI and Turnford & Cheshunt Pits SSSI. Cumulative operational effects are not likely. The HRA Stage 1 Screening Assessment for the Beckton Reuse Indirect Option identified LSE on the Lee Valley SPA and Ramsar site. There is a potential for adverse effects on the Lee Valley SPA and Ramsar site as a result of their close proximity to the construction pipeline corridor and abstraction point on the River Lee and as a result of disturbance (noise, light, dust pollution) during construction on qualifying species. The HRA Stage 2 AA identified transmission pathways but concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar are likely if the suggested mitigation measures are implemented, with no residual effects expected. The development of the allocated sites within Waltham Abbey have the potential to result in air pollution that could impact upon air quality in the district, including Epping Forest. In accordance with Policy DM 2 and Policy DM 22, all proposals on sites which require a Transport Assessment/Transport Statement will be required to undertake an air quality assessment that identifies the potential impact of the development, together with contributions towards air quality monitoring. During construction there is the potential for temporary impacts to local community from noise and air pollution as well as effects on access to facilities, potential receptors include King Harold School and Abbey garden and residential areas in Waltham Abbey. The Beckton Reuse Indirect Option is expected to have an impact on air quality in Air Quality Management Area (AQMA) regions, however construction and operational vehicle flows are unlikely to be above the screening threshold of 100 HDVs and/or 500 LDVs. However, should construction activities overlap, adequate traffic planning with regulators should be implemented to minimise risks of cumulative effects on air quality. There area areas of flood zone 2 and 3 within 1km of Areas WAL T1, R1, R2 & R3 – Epping Forest Local plan (2011-2033) and the pipeline. There is not anticipated to be cumulative construction or operational effects related to flood risk. There is potential for cumulative effects on SPZs resulting from construction with both developments intersecting the same SPZ. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option.	Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys at future design stages. Implement mitigation as set out in the informal HRA (Technical Supporting Document B2, Habitats Regulations Assessment). Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Under the guidance of the Epping Forest District Council (EFDC) (2015) (as lead local flood authority) displacement of surface water flood risk needs to be managed. They also advise that for development over 235m² of impermeable area, a full FRA would need to be submitted along with details of the proposed surface water management strategy. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2. Traffic management plan to be approved by regulators prior to construction.
3	Policy CH1 – Local Plan 2018-2033	Broxbourne District Council	Chestnut Lakeside will be developed as a new mixed use urban village to accommodate 1750 homes.	Cheshunt Lakeside development is over 2km North of the Beckton Reuse Indirect scheme. However, the development is less than 400 metres from Lee Valley SPA and Ramsar site. The HRA carried out by the council indicated the was likely to have an adverse effect on the qualifying interests of the SPA (Bittern, Gadwall and Shoveler). There is potential for cumulative effects from noise, dust, light and vibration pollution during construction. The HRA Stage 1 Screening Assessment for the Beckton Reuse Indirect Option identified LSE on the Lee Valley SPA and Ramsar site. There is a potential for adverse effects on the Lee Valley SPA and Ramsar site as a result of their close proximity to the construction pipeline corridor and abstraction point on the River Lee and as a result of disturbance (noise, light, dust pollution) during construction on qualifying species. The HRA Stage 2 AA identified transmission pathways but concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar are likely if the suggested mitigation measures are implemented, with no residual effects expected. There is potential for cumulative effects from construction resulting from noise and air pollution, with temporary impacts on residential areas within Waltham Cross. The closest element of the Beckton Reuse Indirect Option to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option. There is potential for cumulative impacts on traffic should construction periods overlap.	Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys at future design stages. Implement mitigation as set out in the informal HRA (Technical Supporting Document B2, Habitats Regulations Assessment). Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Under the guidance of the Epping Forest District Council (EFDC) (2015) (as lead local flood authority) displacement of surface water flood risk needs to be managed. They also advise that for development over 235m² of impermeable area, a full Flood Risk Assessment would need to be submitted along with details of the proposed surface water management strategy. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2. Traffic management plan to be approved by regulators prior to construction.

No.	Application Reference	Planning Authority	Application and brief description	Potential for cumulative effects with the scheme	Potential mitigation
4	Policy CH2 – Local Plan 2018-2033	Broxbourne District Council	Rosedale Park will be developed as a series of interlinked new suburban parkland communities to accommodate 800 homes.	The plan period for this development is up to 2038 and as such, there is potential for construction works to overlap with the construction works associated with the Beckton Reuse Indirect scheme. The plan is approximately 2km from the Beckton Reuse Indirect option. There is potential for temporary cumulative effects resulting from noise, dust, light and vibration pollution on the following Local Wildlife Sites (LWS): Meadow of Tudor Village LWS, Longmead Farm Meadows LWS, Albury Fields LWS and Poyndon Farm LWS. Noise and air pollution during construction may have temporary cumulative impacts on residential areas in Goff's Oak and the following community facilities: Rosedale sports ground, St James church, Woodside Primary School, Goff's Oak Primary School. The closest element of the scheme to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors. The development has not predicted any other significant adverse residual effects, and it is considered unlikely that there would be significant cumulative effects when combined with the Beckton Reuse Indirect scheme. There is potential for cumulative impacts on traffic should construction periods overlap.	Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys at future design stages. Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Traffic management plan to be approved by regulators prior to construction.
5	Policy PB2 – Draft Local Plan	Hertsmere Borough Council	The former Potters Bar Golf Course is proposed for development. The new development will provide a sustainable new neighbourhood delivering around 500 new homes.	The plan period for this development is up to 2038 and as such, there is potential for construction works to overlap with the construction works associated with the Beckton Reuse Indirect scheme. There is potential for temporary cumulative effects resulting from noise and air pollution on Castle Lime Works Quarry SSSI, depending on the timings of construction. No cumulative operation impacts on sites are anticipated. There are areas of Flood zone 2 and 3 that are within 1km of PB2 within the Plan and the Beckton Reuse Indirect pipeline. There is not anticipated to be cumulative construction or operational effects related to flood risk. There is potential for cumulative effects on SPZs resulting from construction with both developments intersecting the same SPZ. The closest element of the scheme to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect scheme. There is potential for cumulative impacts on traffic should construction periods overlap.	Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys at future design stages. Implement mitigation as set out in the informal HRA (Technical Supporting Document B2, Habitats Regulations Assessment). Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Under the guidance of the Epping Forest District Council (EFDC) (2015) (as lead local flood authority) displacement of surface water flood risk needs to be managed. They also advise that for development over 235m² of impermeable area, a full FRA would need to be submitted along with details of the proposed surface water management strategy. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2.
6	Policy PB3 – Draft Local Plan	Hertsmere Borough Council	Land to the south of Potters Bar is proposed for development. The new development will provide a sustainable new neighbourhood delivering around 900 new homes.	There is potential for construction works to overlap however, the plan is over 2km from any designated sites and over 3.5km from proposed construction sites of the Beckton Reuse Indirect Option. No notable cumulative effects on any other sensitive receptors are anticipated during construction or operation.	N/A
7	Policy NS1 – Draft Local Plan	Hertsmere Borough Council	Plan period is up to 2038- This area of Green Belt Land within Shenley Parish is being considered for a New Garden Village with leisure, educational and employment/business facilities. Initially 2400 homes proposed, with capacity for up to 6000 homes.	During the construction period, depending on the timings of construction there is potential for cumulative effects from noise, dust, light and vibration pollution on the following designated sites: Redwell Wood SSSI, Castle Lime Quarry SSSI and Colney Heath Local Nature Reserve. There is potential for cumulative effects on SPZs resulting from construction with both developments intersecting the same SPZ. The closest element of the scheme to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors. The development has not predicted any other adverse residual effects, and it is considered unlikely that there would be cumulative effects when combined with the Beckton Reuse Indirect Option. There is potential for cumulative impacts on traffic should construction periods overlap.	Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys at future design stages. Implement mitigation as set out in the informal HRA (Technical Supporting Document B2, Habitats Regulations Assessment). Implement best practice construction methods, such as communication, site preparation, switch off policies and damping, to reduce effects on air quality. Construction within SPZs requires additional assessment and potentially mitigation to ensure no adverse impacts on public water supplies. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2. Traffic management plan to be approved by regulators prior to construction.
8	2013/3223	London Borough Hackney	Outline planning permission (all matters reserved) for demolition of existing buildings and structures at Woodberry Down Estate to provide up to 275,604sqm floorspace GEA (excluding car parking); comprising up to 3,242 residential units and a maximum of 10,921sqm non-residential floorspace	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
9	HGY/2021/3175	London Borough Haringey	Hybrid Planning application seeking permission for 1) Outline component comprising demolition of existing buildings and creation of new mixed-use development including residential (up to 2,869 new homes), commercial, business & service, leisure, community uses.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
10	Policy SA13 – Draft Local Plan	London Borough Enfield	Edmonton Green Shopping Centre, Mixed-use development comprising 1,173 homes	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A

No.	Application Reference	Planning Authority	Application and brief description	Potential for cumulative effects with the scheme	Potential mitigation
11	Policy SA15 – Draft Local Plan	London Borough Enfield	Joyce Avenue and Snells Park Estate, Housing development comprising 1,217 homes	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
12	Policy SA19 – Draft Local Plan	London Borough Enfield	IKEA store; Tesco Extra, 1 Glover Drive; Meridian Water Willoughby Lane and Meridian Way, Mixed-use development comprising 5,000 homes	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
13	Policy SA01 – Proposed Submission Waltham Forest Local Plan Part 2	London Borough Waltham Forest	Leyton Mills Retail Park, Comprehensive redevelopment to provide new residential (1,950 homes), retail and commercial development, a new primary school, nursery, and public connectivity improvements including links to Ruckholt Road Station.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
14	Policy SA02 - Proposed Submission Waltham Forest Local Plan Part 2	London Borough Waltham Forest	New Spitalfields Market, Comprehensive redevelopment to provide a new neighbourhood, including cultural, industrial, residential (2,750 homes), nursery and complementary uses, and new public transport infrastructure including links to Ruckholt Road station.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
15	Policy SA03 - Proposed Submission Waltham Forest Local Plan Part 2	London Borough Waltham Forest	Auckland Road LSIS, Comprehensive redevelopment to provide mixed use development comprising residential (1250 homes) and commercial uses subject to the two-stage industrial masterplan process. Development proposals will be required to demonstrate compensatory capacity within North London in line with Policy 1 of the North London Waste Plan.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
16	Policy SA16 - Proposed Submission Waltham Forest Local Plan Part 2	London Borough Waltham Forest	Whipps Cross University Hospital, Comprehensive redevelopment of site to provide a new state -of -the - art modern hospital facility and new homes (1,500), as well as reprovision of social care facilities on and off-site. There will also be a provision of other cultural and commercial uses to support the new residential community, health based uses and associated workforce.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
17	Policy SA19 - Proposed Submission Waltham Forest Local Plan Part 2	London Borough Waltham Forest	Tesco and adjoining sites, Leytonstone, Comprehensive phased re-development of a supermarket and adjoining sites including the McDonalds Restaurant, former Gainsborough Road substation, the Moreia Welsh Presbyterian Church and other smaller adjoining sites to deliver new homes (1,100), non-residential floorspace including new green space, retail and nursery provision with enhanced links to Leytonstone Town Centre.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A
18	Policy SA38 - Proposed Submission Waltham Forest Local Plan Part 2	London Borough Waltham Forest	Sterling House, Willow, House and Homebase, Redevelopment of existing office and retail warehouse space to provide new homes (695), non-residential floorspace, workspace, community uses and new public realm.	HRA AA conducted for Beckton Reuse Indirect Option concluded that no adverse effects on the integrity of the Lee Valley SPA and Ramsar site are likely if appropriate mitigation is implemented, with no residual effects expected. Therefore, no cumulative effects are anticipated. The developments are distant enough from the Beckton Reuse Indirect Option that no other common receptors were identified with potential for cumulative effects.	N/A

Affinity Water

Thames Water