SESRO

Thames to Southern Transfer SRO, WTW Site Identification Report

J696-DN-A01A-ZZZZ-RP-ZD-100007

May 2024

Notice

This document has been produced to support the public consultation on key infrastructure options, draft Design Principles and an Interim Master Plan for the South East Strategic Reservoir Option and to inform scoping of the environmental impact assessment. The information presented represents the current stage of the project design. It comprises material or data which is still in the course of completion, pending consultation, engagement and further design and technical development.

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Glossary

Term	Definition
Gate 3 Interim Landscape and Environmental Master Plan	This is the master plan that is being developed for inclusion in the public consultation in 2024. It is a revision to the Indicative Gate 2 Master Plan based on work undertaken for the development of the SESRO project since the Gate 2 RAPID submission.
Indicative Gate 2 Master Plan	The SESRO master plan developed for the Gate 2 RAPID submission (November 2022).
National Policy Statement (NPS) for Water Resources Infrastructure	A policy paper by the Department for Environment Food & Rural Affairs (Defra) designated in September 2023 that sets out the government's policies for developing nationally significant infrastructure projects for water resources in England. Full information on the NPS for Water Resource Infrastructure is available online at: https://www.gov.uk/government/publications/national-policy-statement-for-water-resources-infrastructure
Nationally Significant Infrastructure Project (NSIP)	The Planning Act 2008 introduced a new bespoke consenting route for major infrastructure projects in the fields of energy, transport, water, waste and wastewater. An NSIP is a project that can be consented via this route.
Preferred Option	The preferred option at this time, following the option appraisal undertaken working towards the Gate 3 submission but before the public consultation in 2024. It is the preferred option for public consultation in summer 2024.
Red/Amber/Green (RAG) Score	Red, Amber, Green (RAG) scoring categories were used to inform the scale

Term	Definition
	of the impact or benefit of each option against each of the appraisal criteria. The RAG 'score' represents a subject-matter expert judgement based on the evidence evaluated in the options appraisal.
Regulators' Alliance for Progressing Infrastructure Development (RAPID)	An alliance of the three water regulators Ofwat, the Environment Agency and the Drinking Water Inspectorate formed to help accelerate the development of water infrastructure and design future regulatory frameworks. Full information on RAPID is available online at: https://www.ofwat.gov.uk/regulated-companies/rapid/
South East Strategic Reservoir Option (SESRO) Project	The concept for the South East Strategic Reservoir Option is to abstract water from the River Thames near Culham when sufficient flow is available, store it in a non-impounding raw water reservoir, located to the south west of Abingdon in Oxfordshire, and release it to the same river reach to augment flow in the river for downstream abstraction at times of low flow.
Thames to Southern Transfer (T2ST)	A separate strategic water resources project that proposes to transfer water from SESRO to the Southern Water area. Proposal includes a water treatment works and pipeline transfer.
Water Resource Management Plan (WRMP)	Plans that must be produced by water companies every five years to set out how they will continue to supply water in their supply area over (at least) the next 25 years.
Water Resources South East (WRSE)	An alliance of the six water companies that cover the South East region of England, which are Thames Water,

Term	Definition
	Affinity Water, South East Water, Southern Water, Portsmouth Water and Sutton & East Surrey (SES) Water. Full information on WRSE is available online at: https://www.wrse.org.uk/
National Landscape	Revised name for Area of Outstanding Natural Beauty (AONB) – November 2023. Note in Appendices may still be referred to as AONB.
Water Treatment Works (WTW)	A facility that treats water to improve water quality. The WTW referred to in this report would produce potable water for transfer and distribution to supply customers.

Executive Summary

Appraisal process and findings

The purpose of this appraisal study is to identify preferred site(s) for the Thames to Southern Transfer (T2ST) Water Treatment Works (WTW) within the SESRO site, to ensure that an appropriate location can be taken into account accurately to inform the design and assessment required for the SESRO DCO. It is currently proposed that the T2ST scheme would be designed, consented and constructed by Southern Water. However, a final decision on the precise consenting arrangements has not yet been made and it will continue to be reviewed by Thames Water and Southern Water, taking into account project programmes and delivery timescales. It is expected that the consent application for the T2ST scheme would be submitted in 2030, following a decision on the SESRO application.

The process followed for establishing the preferred options is listed below:

- An assessment methodology was established (for further information see the SESRO Overarching Options Appraisal Report).
- A list of criteria was developed under the themes of Engineering, Cost and Carbon, Environment and Community, Planning and Land.
- Options were defined to a sufficient level of detail for them to be assessed.
- Technical specialists assessed the options against the developed criteria which had been assigned to them, based on their expertise and the assessment methodology.
- A workshop was held to bring together specialists, debate and agree a consensus opinion on a preferred option.

At this stage more than one preferred WTW site option has been identified for consultation in summer 2024. Only one option will be taken forward into design for planning following consultation and further work. The preferred sites have been selected through consensus evaluation of their performance against the appraisal criteria. Figure 0.1 below shows the outcome of the appraisal study, in that Options 2 and 4 are the preferred options for the T2ST WTW location.

Figure 0.1: T2ST Preferred WTW Options

Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

Note: The Interim Landscape and Environmental Master Plan for summer 2024 consultation includes minor changes to the shape of the ponds and other landscape features, which are not material to this WTW study.

A more detailed summary of conclusions is presented in Chapter 7 of this report.

Next Steps

The following activities are required to progress option selection and develop the SESRO design:

- The preferred options will be included in the SESRO Gate 3 Interim Landscape and Environmental Master Plan for summer 2024 consultation.
- To facilitate selection of a single preferred option for DCO an Option 2 buildability review will be undertaken. This will further consider the compounds required for construction of SESRO to confirm the feasibility of Option 2, as covered in Section 6.1.3.
- Option 4 is located adjacent to the indicative boundary of SESRO, which could change in further iterations of the design and Master Plan before the Order Limits are set for DCO. Specific back-checking of boundary changes will be undertaken in relation to Option 4 as the design develops.
- Validate the desktop studies underpinning assessments made for this appraisal with field surveys and stakeholder engagement, where required.
- Backcheck the appraisal to consider any changes and/or additional information, including consideration of feedback from the non-statutory consultation in Summer 2024. Section 1.2 contains further detail on backchecking.
- Develop and undertake a scope of work for further design development and integration between T2ST and SESRO, as covered in Section 7.2.

1 Introduction

This section provides an overview of the purpose of this report and its relationship to the other SESRO option appraisal reports. It also contains back-checking undertaken that is specific to the SESRO T2ST WTW options appraisal work and any changes to the report since the previous revision.

1.1 Purpose of this report

1.1.1 The South East Strategic Reservoir Option (SESRO) is a strategic resource to the south east to secure water supplied for Thames Water, Affinity Water and Southern Water customers. The project is being developed for RAPID Gate 3 submission and an application for a Development Consent Order (DCO) under the Planning Act 2008 regime.

1.1.2 The SESRO Design Development Process is outlined in the SESRO Options Appraisal Context and Methodology Report. Stage 3 of this process is the optioneering of associated infrastructure and for Gate 3, options appraisals were undertaken for infrastructure identified as being essential associated infrastructure for the reservoir. It is noted that a T2ST WTW is not essential infrastructure for SESRO, but it is essential infrastructure for the T2ST project that is reliant on water from SESRO. This study was started later than the SESRO specific studies and therefore has used emerging outcomes of other studies to inform the study area and option definition.

1.1.3 T2ST is a Strategic Resource Option (SRO) transferring available water from SESRO to the Southern Water Hampshire area, Thames Valley and South East Water's Basingstoke area. As per the T2ST Gate 2 Concept Design Report (Annex A3)[1] "the requirements for multiple treatment sites and pretreatment measures result in raw water options having higher capital expenditure (CAPEX) and operating expenditure (OPEX) compared to potable options, and hence only the potable options passed through the secondary screening stage of the option appraisal".

[1] https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-transfer-from-thames-water-to-southern-water/gate-2-reports/T2ST-Gate-2-Annex-A3--Concept-Design-Reportpdf.pdf

Figure 1.1: T2ST Schematic

Source: Figure supplied by T2ST

1.1.4 Preliminary investigations by Southern Water indicate that the preferred location for the proposed Water Treatment Works along the T2ST scheme route is at the SESRO reservoir. This is for operational, engineering, environmental and planning reasons, including the need for water treatment to be located north of the River Lambourn for water quality reasons, the landscape sensitivity of the North Wessex Downs National Landscape, the proximity to the reservoir as the source of water for the T2ST scheme and available wastewater treatment near to the reservoir site.

1.1.5 Therefore, this option appraisal has been undertaken to consider the siting of the T2ST WTW within the SESRO site (based on the SESRO Gate 2 site footprint).

1.1.6 T2ST consists of raw and potable water transfer pipelines, a water treatment works, break pressure tanks, pumping stations and connections to existing

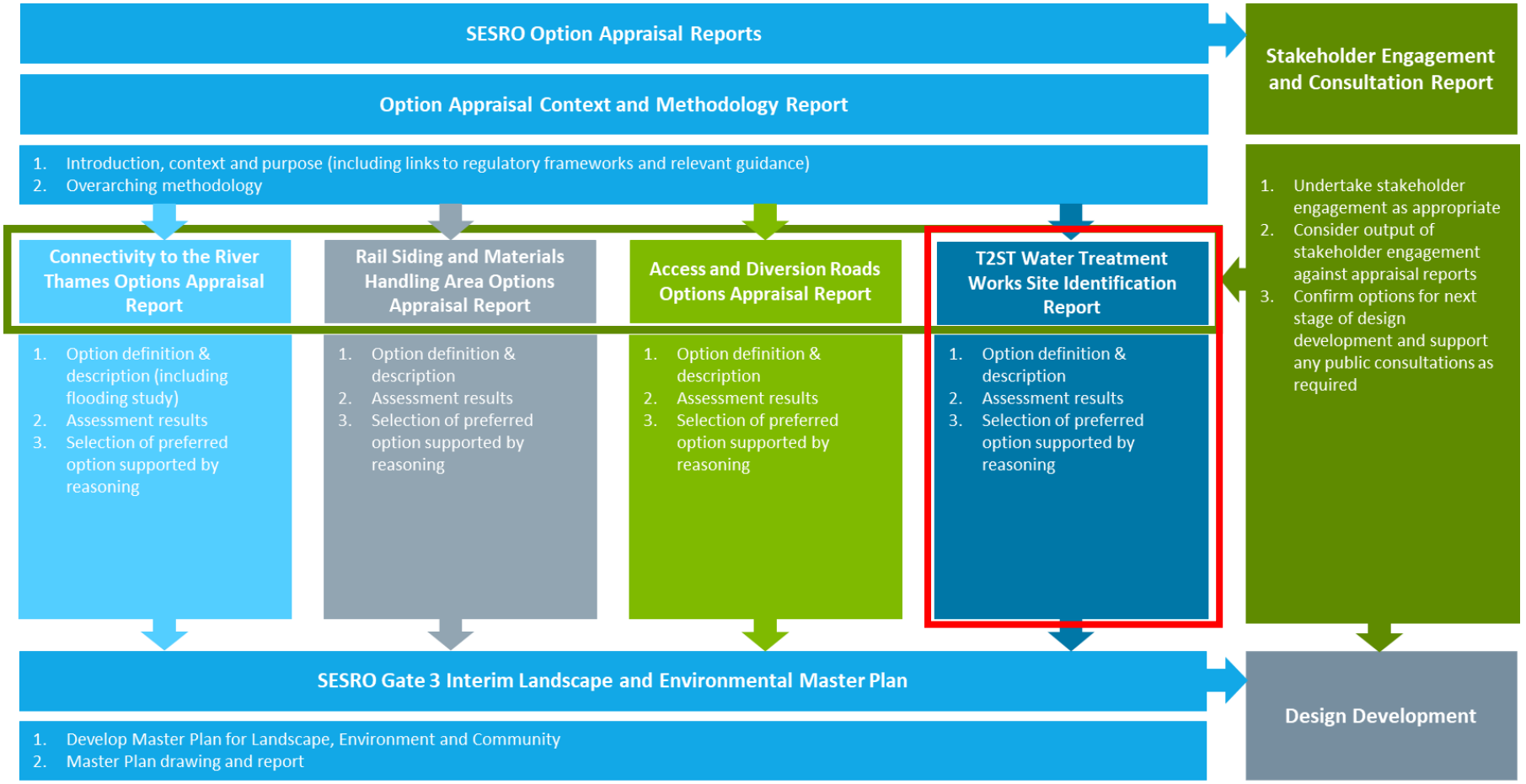
Southern Water assets, for further details refer to T2ST Gate 2 Concept Design Report (Annex A3)[2]. The draft Water Resources South East (WRSE) Regional Plan sets out the need for T2ST and this feeds into the relevant Water Resource Management Plans (WRMPs) from Thames Water, Southern Water and South East Water.

1.1.7 Details of the T2ST WTW including two options for the preliminary configuration and layout of WTW were provided to the SESRO design team by the T2ST team, details of these and further assumptions can be found in Section 5.2.

1.1.8 This report forms part of a suite of option reports, as shown in Figure 1.2. The SESRO Option Appraisal Context and Methodology Report (J696-DN-A01A-ZZZZ-RP-100006) describes the approach and methodology adopted for all the option appraisals.

[2] The RAPID gated process and the proposed water resource solutions - Ofwat

Figure 1.2: SESRO Options Appraisal Document Suite
(Current document highlighted in red outline)[3]



Source: Thames Water Internal, 2024

[3] All the reports shall be made available on request during the public consultation.

1.2 Back-checking and changes to this report

1.2.1 This is the first draft issue of this report and therefore no back-checking has been undertaken. In future revisions this section will summarise any back-checking undertaken that is specific to the SESRO T2ST WTW option appraisal study and any changes to the report since the previous revision.

1.2.2 It is expected that the next backcheck of the options will be undertaken in the Autumn 2024 to consider changes and/or additional information that may have been identified by that time through Gate 3 design development work. A timetable for backchecking beyond Autumn 2024 will be decided dependent on future need, with interim backchecks to be undertaken sooner if a significant change is identified before Autumn 2024.

2 Options Appraisal Methodology

This section outlines the WTW options appraisal methodology, following the appraisal steps in the common approach set out in the SESRO Option Appraisal Context and Methodology Report.

2.1 Overview of Appraisal Methodology

2.1.1 The SESRO Option Appraisal Context and Methodology Report sets out the appraisal methodology, which is a common approach that has been adopted for all the option appraisal studies at Gate 3.

2.1.2 A summary of the activities undertaken for the WTW option appraisals is provided below, in line with the steps in the appraisal methodology.

2.2 Appraisal Step 1: Define Scope and Objectives of Appraisal

2.2.1 The definition of the scope and objectives of options appraisal at Gate 3 was undertaken at a project level and reported in the SESRO Option Appraisal Context and Methodology Report. That report sets out the overarching purpose of the options appraisals to support progress towards DCO submission and a Gate 3 submission to RAPID.

2.2.2 Southern Water are developing the T2ST Strategic Resource Option that will transfer water from SESRO for use in the Southern Water Hampshire area. T2ST also includes connections with Thames Water (Newbury), South East Water (Basingstoke) and Portsmouth Water. The site identification detailed in this WTW report was undertaken to identify potential locations for the T2ST WTW at the site of the SESRO reservoir on land to be acquired and provided by Thames Water.

2.3 Appraisal Step 2: Define Constraints on Option Definition

2.3.1 A staged assessment was undertaken whereby the extents of the study area / indicative location for SESRO was defined. Once the study area was defined, a design constraint map was developed that split the study area into zones with similar characteristics.

2.3.2 The outputs of both the constraint mapping and zoning exercise were then used together to form the next step of the option definition process, land parcels. Potential WTW land parcels for further investigation were identified within areas without major design constraints and within zones that passed initial screening. The land parcels that passed through this stage then went onto Stage 4 Option definition whereby potential land parcels upon which to site a WTW were identified.

Study Area definition

2.3.3 Preliminary investigations by Southern Water indicate that the preferred location for the proposed Water Treatment Works along the T2ST scheme route is at SESRO; therefore, this SESRO WTW study considers locations suitable for a WTW within the indicative boundary of the SESRO project. Sites local to SESRO but not within the anticipated boundary of the SESRO project are considered within the aforementioned Southern Water investigations. If a suitable location cannot be found within SESRO then the T2ST project may undertake further site selection work.

2.3.4 Within the SESRO area it was important to define a study area to ensure an appropriate and unbiased approach to identifying a set of reasonable WTW land parcels and pipeline route corridor options to appraise. The WTW is essential infrastructure for the T2ST scheme (as noted in the Section 1.1) and the option appraisal study was started later than the SESRO specific studies, therefore the study area was initially generated based on the land use extents shown on the evolving SESRO Interim Landscape and Environmental Master Plan[4]. This initial study area was then extended to include a land parcel associated with the preferred rail siding option included within the SESRO Rail Siding and Materials Handling Area Options Appraisal Report (J696-DN-A01A-ZZZZ-RP-ZD-100008). The WTW study was progressed rapidly to inform the final Interim Landscape and Environmental Master plan for consultation.

Constraint Mapping

2.3.5 A GIS based 'constraint tagging' approach was used to exclude areas of land within the study area, based upon constraints. A 'constraint' is considered to be an aspect that would likely present significant challenges to delivering or securing the development consent for the WTW. The study area polygon subdivision and tagging process was undertaken using GIS software and by applying buffers to the SESRO asset hierarchy detailed below. Technical specialists responsible for individual design elements agreed upon constraint buffers, which are documented in Table 3.1 and Table 3.2.

2.3.6 One of the design criterion established for the T2ST WTW is that the selected location must not adversely impact the delivery of the SESRO project, therefore, a SESRO asset hierarchy was developed as below.

- Table 3.1Table 3.2Tier 1: SESRO assets that cannot be moved to accommodate a WTW and are therefore not considered available for identification of suitable WTW land parcels. As set out in Section 1.2 – Design Development Process of the SESRO Option Appraisal Context and Methodology Report (J696-DN-A01A-ZZZZ-RP-100006), the storage

[4] Interim Landscape and Environmental Master Plan with Auxiliary Drawdown Channel (ADC) drawing J696-AJ-A02X-ZZZZ-DR-EN-100019

capacity and location of the SESRO project and the shape and position of the reservoir are identified in Stages 1 and 2. The reservoir footprint and a small number of other assets were therefore assumed to have a fixed location in the WTW optioneering process, Table 3.1 details these assets.

- Tier 2: SESRO or 3rd party assets that may be repositioned, if necessary, however would result in re-design / optioneering / capital cost to negate clashes, therefore avoidance is preferable, and they have not been considered available for identification of suitable WTW land parcels. Table 3.2 details these assets.
- Tier 3: SESRO assets or 3rd party assets that may be repositioned with minimal re-design / optioneering / capital cost to negate clashes. Tier 3 assets are not considered a significant constraint and have therefore been considered available for placement of suitable WTW land parcels.

2.3.7 The outputs of this stage are presented in Section 3.2 of this report.

Zones

2.3.8 The study area was split into zones with similar characteristics, considering themes such as vicinity to residential areas, infrastructure congestion (including potential impact on existing infrastructure), and the future land use e.g., floodplain, reservoir, access road. The zoning exercise was used in conjunction with the constraint mapping described above to identify suitable land parcels, enabling the identification of the most appropriate land parcels for progression to the Step 5 option assessments.

2.3.9 The outputs of this stage are presented in Section 3.3 of this report.

2.3.10 While there is some overlap between the stages of the land parcel identification process, both stages have been deemed necessary and showcase unique constraints. The constraint mapping, which focuses on key design features only, misses out on important constraints such as proximity to residential areas and construction phasing concerns. By combining the two stages, a more comprehensive understanding of SESRO constraints emerges, enabling the identification of suitable land parcels.

WTW Land Parcel Footprint Size

2.3.11 The Gate 2 conceptual layout footprint sizes[5] presented in Table 2.1 below were provided to the SESRO project by the T2ST project and were used to identify potential land parcels within the zones for the T2ST WTW and its associated construction compound. The sizes are derived from T2ST conceptual design work and therefore could be subject to change, detailed in

[5]Footprint sizes relate to material or data which is still in the course of development and therefore could be subject to change.

Sections 0 and 5.2.

Table 2.1: WTW land parcel footprints

Description	Footprint (Ha)
WTW	6.18[6]
Construction compound	2.25
Total	8.43

Source: Thames Water Internal, 2024

2.3.12 The outputs of this stage are presented in Figure 3.3 of this report.

2.4 Appraisal Step 3: Develop Appraisal Criteria

2.4.1 The SESRO Criteria Table developed for the options appraisals of associated infrastructure can be found in Appendix A of the SESRO Option Appraisal Context and Methodology Report (J696-DN-A01A-ZZZZ-RP-100006), as described in Section 1.1.8 and Figure 1.2.

2.4.2 Criteria descriptions in this table were developed under the key themes of Engineering (constructability and operability), cost and carbon, environmental performance, community, planning and property, and land acquisition.

2.4.3 In general, the criteria relate to key requirements and considerations for the SESRO project based on relevant legislation, policy, and guidance, as well as operational and engineering requirements. They are therefore applicable across the different options appraisals for the associated infrastructure for the reservoir, including the WTW, rail siding and materials handling areas, access and diversion roads, and connectivity to the River Thames.

2.4.4 Of the 133 general criteria, 35 were not assessed in this study as they do not relate to the feasibility of the option or facilitate differentiation across potential WTW sites or are already assessed under another criteria. Examples of these are.

- CON5C – 3rd Party Impact – Potential to disrupt existing solar farm infrastructure during enabling works and construction – Not applicable or no differentiation across potential WTW sites.
- OPS5A – Adaptability – Space available for future expansion of social / recreation infrastructure, not applicable and WTW expansion is considered under Adaptability – Flexibility for future modification (OPS5B).

[6]The combined constraints mapping utilised the larger of the two footprints to allow a degree of future flexibility in Step 4, for instance when considering the shape of the polygon / land parcel and required WTW layout.

2.4.5 A full list of the excluded RAG criteria and the reasoning for exclusion is within Appendix E.

2.4.6 In addition to the general criteria, for the assessment of the WTW options only, the following criteria were included in the assessments:

- CON7E – Construction Complexity – Complexity of pipeline installation within corridors. This considers if the pipeline routes (raw, potable, contingency and foul) face challenges that increase their complexity and risk compared to other routes. This includes passage through congested pinch points, risk of ground settlement, and / or obstacle avoidance.
- OPS4C – Reliability – Impact of WTW location on gravity discharge of excess water e.g., overflows and contingency / commissioning discharges. This considers if pumping is required potentially introducing a single point of failure and if mitigation measures can be introduced to avoid interruption to supply.

Cost and Carbon

2.4.7 RAG criteria COS1 considers the CAPEX cost of the option and CAR1 the Carbon Emissions (as tonnes of CO_2e) associated to the CAPEX of the option. For the purposes of this appraisal, the values corresponding to the WTW are consistent across all options. The key differentiator is the pipelines associated with the WTW options. Cost and Carbon calculations are based on pipeline design information and unit rates provided by the T2ST team, along with assumed routes and corresponding measured GIS lengths.

2.4.8 To ensure a degree of consistency across the different SROs, the ACWG has provided guidance and a spreadsheet template for capturing the Quantitative Costed Risk Assessment (QCRA) and calculating Optimism Bias (OB)[7]. At this stage OB and costed risk associated with cost increases that may occur during the development and delivery of the selected option are envisaged to be similar across all WTW options and therefore have not been considered.

2.4.9 Since operational costs would mainly be for maintenance, which would be very similar for each of the WTW options, operational cost is not a differentiator and was not considered.

2.5 Appraisal Step 4: Define Options

2.5.1 The options were defined over the course of several discussions amongst the SESRO and T2ST teams.

2.5.2 Pipeline routes were then developed for each WTW option, which were technically feasible and avoided Tier 1 constraints as identified in appraisal step

[7] ACWG (2021), Appendix A-1 - Optimism Bias and QCRA Template - Rev C.xlsx

2. Each route was drawn up in a plan with an accompanying description for appraisal step 5 (outlined below).

2.5.3 A summary of appraisal step 4 for the WTW and associated pipeline corridors is presented in Section 4 of this report.

2.6 Appraisal Step 5: Undertake Individual Assessments

2.6.1 In this appraisal step, each option identified in step 4 was reviewed and assessed by specialists against the applicable criteria in the SESRO Criteria Table, which was developed in appraisal step 3. For each applicable criterion, an option was given a red, amber, or green (RAG) score. The RAG score indicates the performance of an option within the ambit of each criterion and the RAG score definitions are as follows:

- Red - A red RAG score is given for a specific option-criterion combination when the option performs poorly against the criterion. For each criterion a poor (or 'red') performance is defined in the SESRO Criteria Table because it is criteria specific, and a red RAG rating does not necessarily equate to a constraint that makes the option infeasible. A red score would however generally indicate the introduction of a significant risk, which may not be easy to mitigate, to the project from the option being assessed.
- Amber - An amber RAG score is given for a specific option-criterion combination when the option performs moderately against the criterion, neither poorly enough to warrant a red RAG score nor so well as to warrant a green score. For each criterion an amber score is defined fully in the SESRO Criteria Table because a 'moderate' performance is criteria-specific, so no generalisation of an amber score across the range of appraisal criteria can be made here.
- Green - A green RAG score is given for a specific option-criterion combination when the option performs well against the criterion. As with red and amber scores, a green RAG score is defined for each criterion specifically, as set out in the SESRO Criteria Table.

2.6.2 The RAG assessment for each WTW option was recorded in the standard format across the associated infrastructure options appraisals. The narratives from relevant specialists documenting the reasoning behind why each RAG score was given for each WTW option are included within Appendices A to D of this report.

2.6.3 A summary of appraisal step 5 for the T2ST WTW is presented in Section 5 of this report. The performance of the WTW options against the assessment criteria developed in step 3 were summarised into subthemes, which are set out below.

Table 2.2: Criteria Subthemes

Key Theme	Subtheme
Constructability (Engineering)	Health and Safety
	Third Party Impact
	Logistics
	Programme
	Construction Complexity
Operability (Engineering)	Health and Safety
	Operational Complexity
	Operational Resilience
Cost and Carbon	Cost
	Carbon
Environmental	Air Quality
	Aquatic Environment
	Biodiversity and Nature Conservation
	Biodiversity and Nature Conservation and Landscape
	Flood Risk
	Historic Environment
	Land Quality
	Landscape and Visual
	Noise
	Pollution
Community, Planning and Land Assessment	Socio-Economic
	Consenting
	Transport Planning
	Property and Land Acquisition

Source: Thames Water Internal, 2024

2.7 Appraisal Step 6: Workshop to Agree Preferred Option

2.7.1 Following the individual assessments in appraisal step 5, a workshop was held to bring together SESRO and T2ST specialists covering the key themes within Table 2.2. The outputs of the assessments against the criteria were discussed to identify preferred options for the T2ST WTW site and to record the reasons for the preferred options.

2.7.2 The assessment subthemes were used to help identify how the different options performed and identify any relevant differentiations between the options. While

all the subthemes have degrees of relevance to consenting, in the sense of being decision-making factors for a DCO application, the 'consenting' subtheme identifies certain more specific or narrower criteria, such as the extent of land required within the DCO Order Limits in due course, local planning policy spatial allocations, or requirements for other consents/licenses.

2.7.3 A summary of appraisal step 6, including the workshop and appraisal outcome, is presented in Section 5 of this report. The key theme and subtheme narratives presented in these report sections are intended to summarise the key points from assessment narratives, present the issues that provided differentiators between options and provide a preferred option with a reasoned justification.

2.7.4 It should be noted that the options appraisals have referred, where appropriate, to interactions with potential future developments identified through the Vale of White Horse Local Plan 2031 and the emerging South Oxfordshire and Vale of White Horse draft joint Local Plan 2041[8], which includes possible movement corridors of Marcham and Abingdon, a possible passenger rail station for Grove and Wantage, and a possible Flood Storage Area west of Abingdon. Due to the relatively long timescale for potential SESRO development, it was considered important to regard any interaction with other possible future infrastructure developments. However, only limited weight has been given to this in the appraisal due to uncertainty over the status of such possible developments, which would be dependent on other parties (such as Oxfordshire County Council or the Environment Agency) and for which there are at the time of writing no firm development proposals or timescales.

2.8 Appraisal Steps 7 and 8: Review against other SESRO appraisals and Master planning and Consultation

2.8.1 Appraisal steps 7 and 8 are not reported within this options appraisal report, but rather they are being undertaken as part of the Gate 3 Interim Landscape and Environmental Master Plan development, as set out in the SESRO Options Appraisal Context and Methodology Report.

[8] South Oxfordshire and VoWH District Councils, Draft Joint Local Plan for South and Vale 2041 Regulation 18 (January 2024). Available online: https://theconversation.southandvale.gov.uk/jlp/

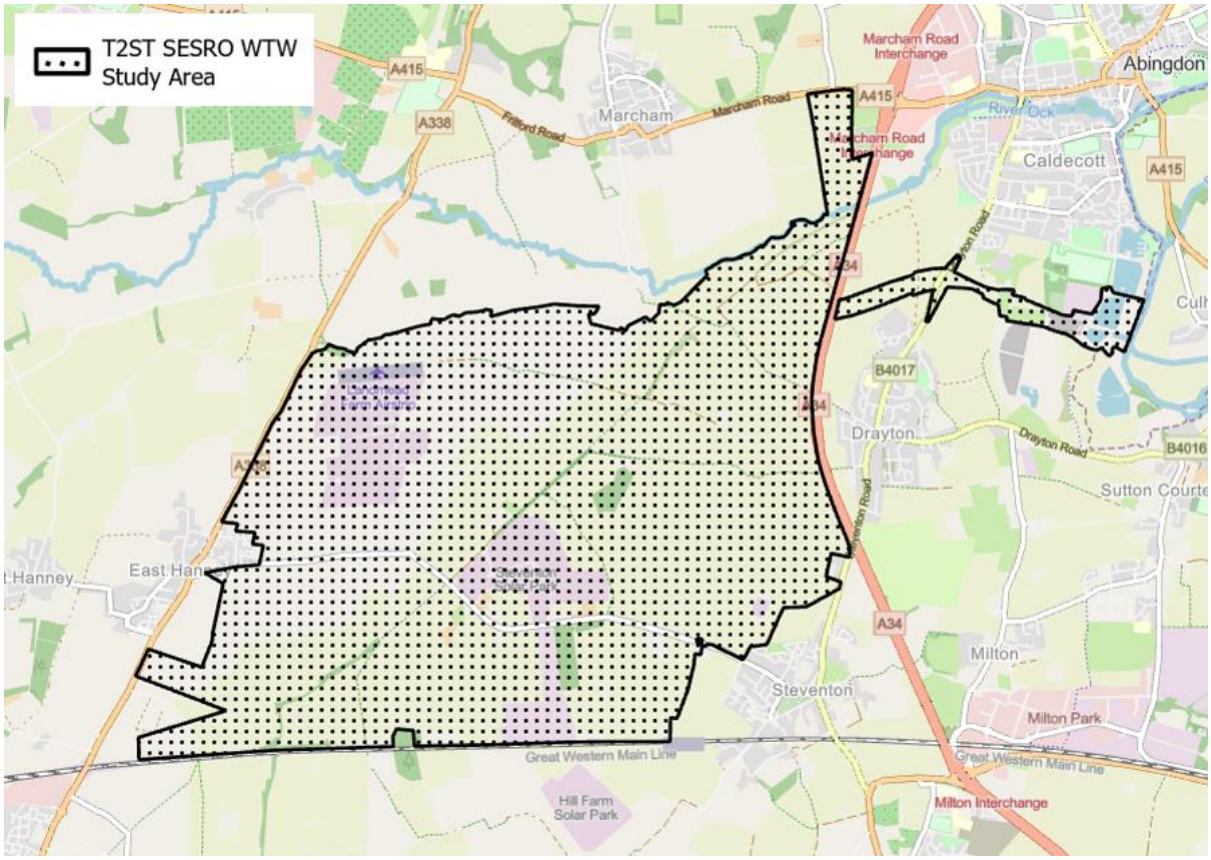
3 Constraints on Options Definition

This section defines the constraints on the options definition for the T2ST WTW Placement, which is step 2 of the appraisal methodology, as set out in Subsection 2.3 of this report.

3.1 Study Area

3.1.1 The first limitation for situating the T2ST WTW is the land boundary defined by the indicative location for SESRO. As noted in Section 2.3 the study area was determined from the evolving Gate 3 Interim Landscape and Environmental Master Plan, alongside the preferred temporary rail siding option. On this basis the extents of the T2ST WTW study are shown in Figure 3.1 below.

Figure 3.1: T2ST WTW SESRO Study Area



Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

3.2 Constraint Mapping

3.2.1 The placement of the T2ST WTW within the SESRO site was initiated during Gate 3. By this stage, several fundamental elements of SESRO had already undergone substantial optioneering for example the location of the main access road. To define a baseline position for the optioneering and minimise the

likelihood of abortive work Tier 1 SESRO assets (Table 3.1) have initially been considered constraints to the WTW siting. In reality, Tier 1 SESRO elements are not fixed (as optioneering reports continue to be progressed and undergo stakeholder engagement and consultation), this factor is considered during the subsequent steps 5 and 6. Proposed SESRO assets that impose initial constraints have been assigned under different tiers as described in Section 2.3.

3.2.2 Additionally, constraints have been considered associated with existing assets on the indicative location for SESRO, including risks related to unexploded ordnance (UXO) and utilities. It is assumed that UXO risks will be addressed as part of the broader SESRO programme and have therefore not been included in the constraint mapping. However, existing utility assets which are to be retained, have been included as a constraint.

3.2.3 Where applicable, a buffer zone has been established around the assets which will also be excluded from consideration. A list of assets and associating buffers applied are provided in Table 3.1 and Table 3.2. Engineering specialists responsible for individual design elements agreed upon constraint buffers, which are documented in Table 3.1 and Table 3.2.

Tier 1 Initial Constraints

3.2.4 This tier focuses on assets that are fixed in design for the purpose of this assessment and cannot be relocated to accommodate a WTW. Noteworthy assets and buffers associated with this tier include:

- Reservoir Outer Embankment Toe – Complete with a 62.5m buffer around the circumference to account for design uncertainty which should be reduced through continuing ground investigation.
- East and West Watercourse Diversion – Complete with a 30.0m buffer. This buffer aims to mitigate any disturbances in alignment with Water Framework Directive compliance.
- Auxiliary Drawdown Channel (ADC) Earthworks – Complete with a 5.0m buffer. The status of the ADC in the Master Plan is undecided at the time of this study due to parallel development of option appraisals. If the ADC is progressed, there is little flexibility in the alignment and has therefore been assigned as Tier 1.

Table 3.1: Constraint Mapping – Tier 1 Items and Respective Buffers

Item	Buffer (m)
West Watercourse Diversion	30
East Watercourse Diversion	30
Replacement Floodplain Storage	2
Reservoir (Outer Embankment Toe)	62.5

Item	Buffer (m)
Conveyance Tunnel ~ 6m Diameter	5
Intake and access road	5
Existing Substation	3
Network Rail Owned Land	5
Post SESRO Flood Mapping	5
Auxiliary Drawdown Channel (ADC)	3
Raw Water Pumping Station	5

Source: Thames Water Internal, 2024

Tier 2 Initial Constraints

3.2.5 This tier focuses on assets that may be repositioned to accommodate the WTW if necessary. Noteworthy assets and buffers associated with this tier include:

- Recreation Lakes – complete with a 3m buffer. The Recreation Lakes (also used as settlement ponds during construction) are currently located within a natural dip in the land, thus presenting an ideal location for lakes whilst minimising earthworks. Placement of a WTW on this location will require additional earthworks, both to construct lakes elsewhere and create a uniform ground for the WTWs.
- Wilts and Berks Canal Corridor – complete with a 5m buffer. The Wilts and Berks Canal Corridor is reserved land for potential future restoration of the Wilts and Berks Canal. Although the recommissioning of the canal is not part of SESRO, the corridor is reserved within the SESRO design in case a third party secures adequate funding to undertake the project. Additionally, the earthworks land profile associated with the canal informs the indicative flood modelling. As a result, the canal corridor's location is integrated into the SESRO design, although any future alterations to the corridor during design development will necessitate further flood modelling work.

Table 3.2: Constraint Mapping – Tier 2 Items and Respective Buffers

Asset	Buffer (m)
Rail Siding	5
Noise Bunds	3
Wilts and Berks Canal Corridor	5
Recreational Lakes	3
Recreational Buildings	5
Car Parking – Hardstanding	5
Car Parking – Grass Crete	5
Main Access Road	5
Operation Maintenance Roads	5

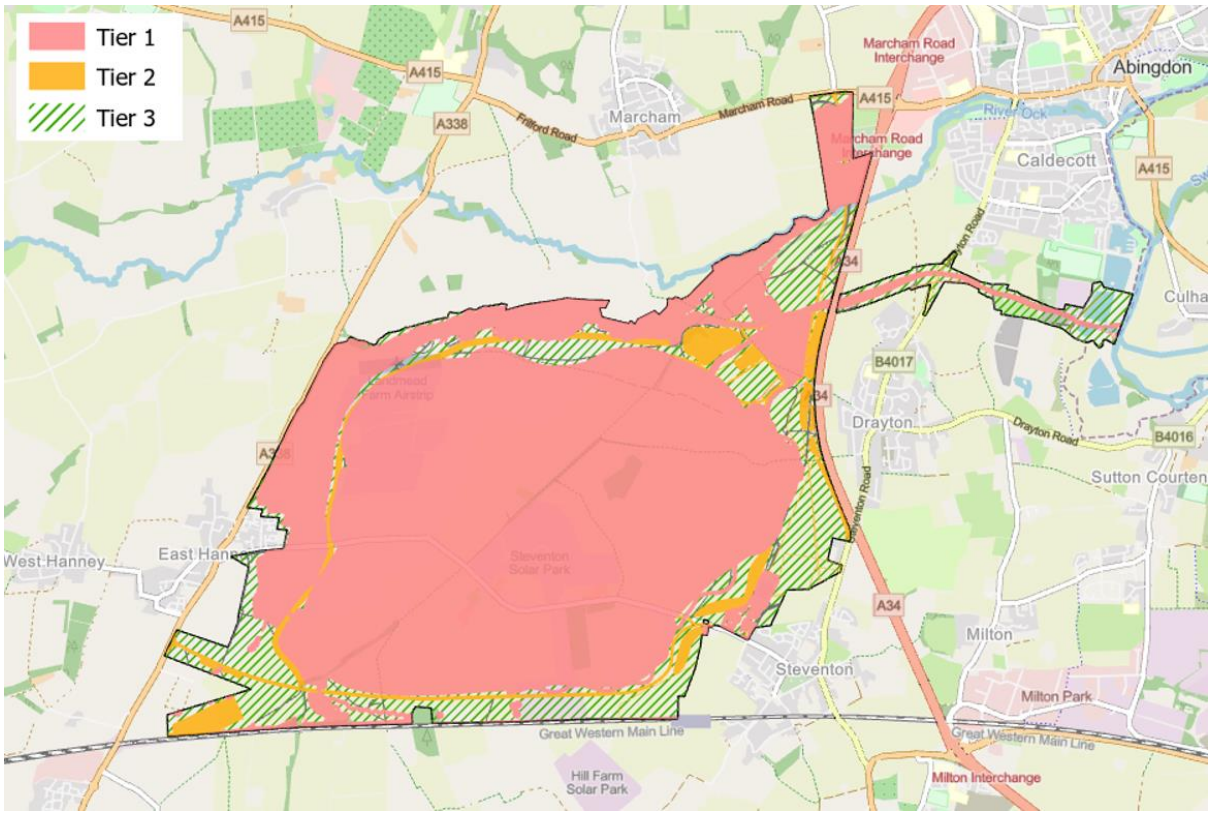
Asset	Buffer (m)
Steventon to East Hanney Diversion	5
Sweetening Flow Pipework	3
Gas Main – Retained	3
Gas Main – New	3
Electricity 132kV – Retained	3
Electricity 132kV – New	3
Water Main – Retained	3
Water Main – New	3

Source: Thames Water Internal, 2024

Tier 3 Initial Constraints

3.2.6 Tier 3 constraints comprise all remaining assets, features, and land. These elements may be relocated with minimal difficulty and do not have any buffer applied.

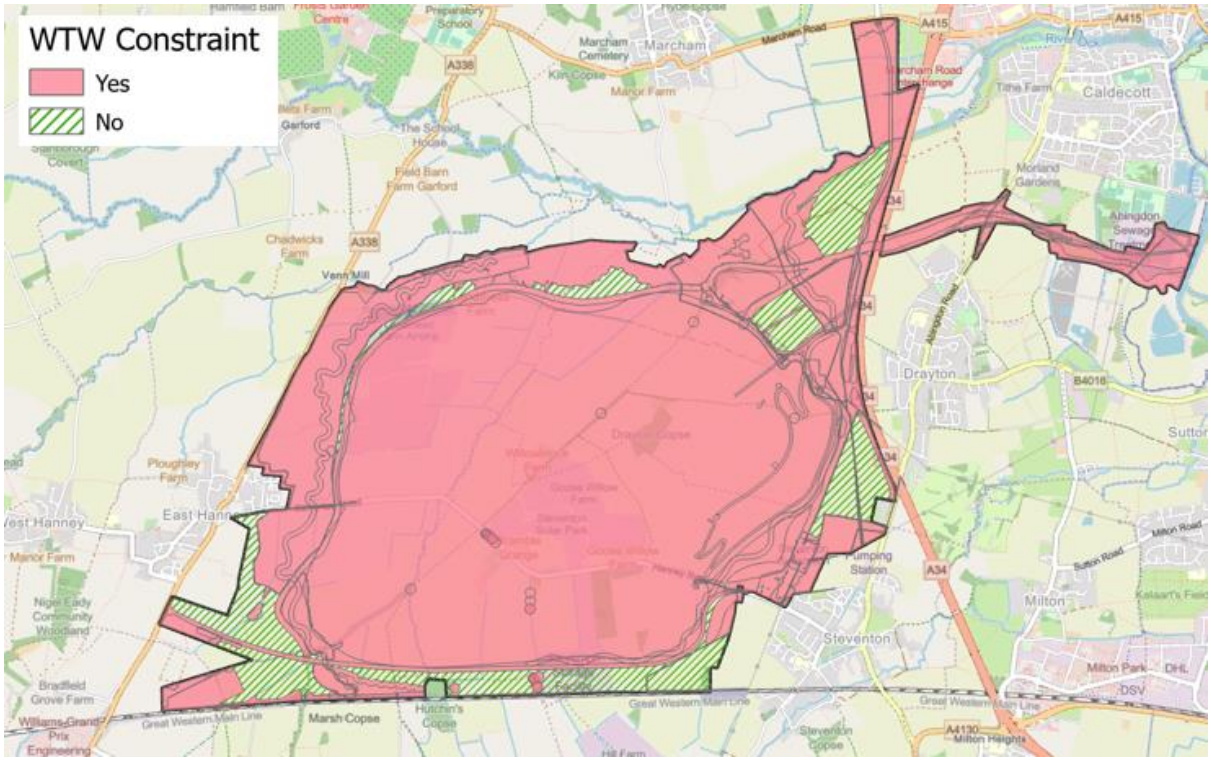
Figure 3.2: T2ST WTW Constraint Mapping



Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

3.2.7 The green hatched regions depicted in Figure 3.3 below represent land parcels that are free from the limitations imposed by Tier 1 and 2 assets, as outlined in the constraints mapping above, and also meet the necessary land parcel size requirements specified in Section 2.3.

Figure 3.3: Combined WTW Constraints Map



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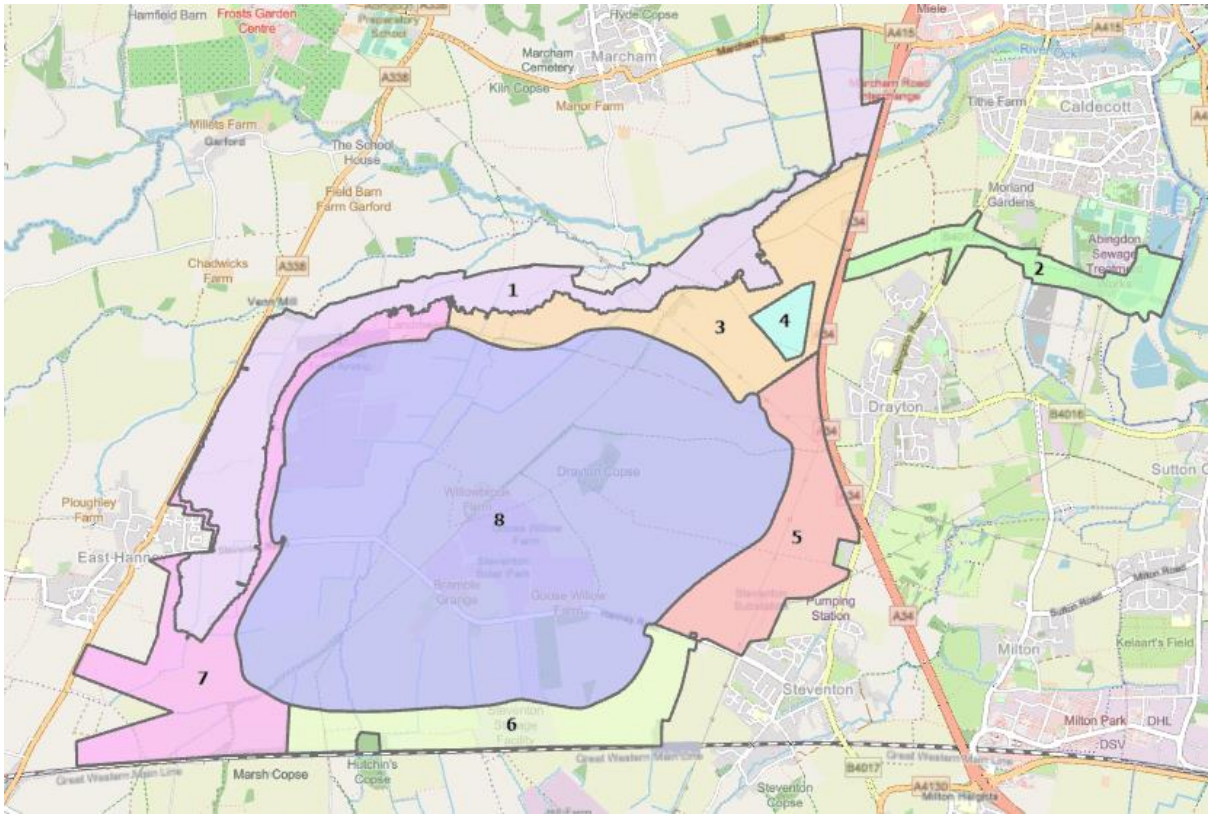
3.3 Zones

3.3.1 Figure 3.4 below depicts the eight zones the study area was divided into to aid the WTW site selection. The purpose of this exercise, in conjunction with the constraint mapping, is to determine which areas within the study area would be preferable and therefore be included within Step 5 – optioneering RAG assessment.

Figure 3.4: T2ST WTW Zones



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3.3.2 Table 3.3 below provides a description of each zone, along with the zone favourability rationale. A workshop was held to bring together SESRO and T2ST specialists, covering the key themes within Table 2.2, to discuss the zone definitions, favourability rationale and to agree the less favourable zones. At this stage less favourable zones have not been taken forwards for further WTW placement consideration. These zones could be considered again should the shortlisted sites become unviable. The zoning exercise is used in conjunction with the constraint mapping to identify suitable land parcels, as covered in Section 3.4.

Table 3.3: Overview of T2ST WTW Zones

Zone	Characteristics	Favourability	Progress (Y/N)
1	Zone 1 ranges in width from ~15m to ~600m and primarily consists of the main SESRO access road and replacement flood storage. It is located on the northern and western side of the site, which is among one of the lower parts at ~51 to 63mAOD, the reservoir embankments at ~80mAOD would likely act as a screening for southern visual receptors. It will also host wetland habitats along with potential visitor attractions. The southwest of the zone is in close proximity to East Hannay.	Less favourable – Development of WTW within a flood plain presents a significant health and safety risk to the construction and operation of a WTW, furthermore the development must not increase flood risk elsewhere. This is supported by the National Policy Statement (NPS) for Water Resources Infrastructure – Section 4.7 and the Environment Agency's flood sequential test. Flood protection infrastructure would increase cost and carbon. There would also be a heightened risk to public health / potable water supply contamination from surface water ingress. Additionally, operational failures and limited site access may reduce the level of service as a result of WTW outage, whilst high water levels pose a risk of structure floatation, further increasing cost and carbon emissions.	N
2	Zone 2 ranges in width from ~62m to ~500m and primarily consists of the Auxiliary Drawdown Channel (ADC) and conveyance tunnel. It is located	Less favourable – Additional land acquisition, design and flood risk. If SESRO utilises the ADC, this zone will primarily serve that purpose, leaving	N

Zone	Characteristics	Favourability	Progress (Y/N)
	approximately 1,250m north-east of the reservoir at ~52 to ~63mAOD. A substantial part of this zone is in the River Thames floodplain. If the ADC is not progressed[9], Zone 2 will likely cease to exist.	insufficient space for a WTW. However, if the ADC is not progressed, placing a WTW in Zone 2 would necessitate additional land acquisition and still pose space constraints. It would likely require significant visual receptor screening / landscaping. The rationale for excluding a WTW within a flood zone can be found in Zone 1. This decision is based on considerations related to flood risk, operational access, and potential impacts on water quality	
3	Zone 3 ranges in width from ~50m to ~550m and consists of the main access road, RWPS, eastern watercourse diversion, and several ponds. It is located in the northeast of the site at ~52 to 66mAODmAOD, the reservoir embankments at ~80mAOD would likely act as screening for western visual receptors. Zone 3 hosts several SESRO assets and includes the preferred site for the main SESRO construction compound. The conveyance tunnel runs along the southern	Favourable – Adequate space, with minimal Tier 1 constraints and low flood risk.	Y

[9] It is noted that the Connectivity to the River Thames option appraisal study progressed in parallel with this WTW study. The preferred emergency drawdown option does not include the ADC, confirming that this zone is not appropriate for consideration and no change to the conclusion in this table.

Zone	Characteristics	Favourability	Progress (Y/N)
	border of this zone, the associated tunnel boring machine launch pit, compound and material handling area, will likely be located within Zone 3.		
4	Zone 4 ranges in width from ~125m to ~550m and consists entirely of flood compensation. It is encompassed by Zone 3, approximately 475m north-east of the reservoir at ~54 to 59mAOD.	Less favourable – Increased flood risk to the WTW. The rationale for excluding a WTW within a flood zone can be found in Zone 1. This decision is based on considerations related to flood risk, operational access, and potential impacts on water quality. This zone is visible to visitors entering and using the reservoir and would require extensive screening to reduce visual impact.	N
5	Zone 5 ranges in width from ~250m to ~700m and primarily consists of existing National Grid and SSE assets including an electrical sub-station, cables and Extra High Voltage overhead powerlines, a 900mm TW potable water trunk main, 12" SGN gas main and SESRO's eastern watercourse diversion and recreational amenities. During construction it will likely contain the main haul road. Depending on the location of the WTW, it may host an additional 1 to 3 No. pipelines of up to 1m in diameter. It is	Less Favourable – Increased construction complexity, health and safety and programme / cost risk due to existing congestion, constrained further by a requirement to install additional SESRO and T2ST assets. Its proximity to residential areas is likely to result in community concerns with aspects such as noise, vibration and visual impact. The shape of the land parcel available is not conducive for constructing a WTW, it would likely require either a bespoke WTW design or	N

Zone	Characteristics	Favourability	Progress (Y/N)
	located on the eastern side of the site at ~55 to 65mAOD. The southeast of the zone borders Steventon whilst the northeast is in close proximity to Drayton.	diversion of at least 2 major utilities. The site of the construction compound may require traversing below several OHP which raises further health and safety concerns.	
6	Zone 6 ranges in width from ~155m to ~360m and contains the Steventon and East Hanney road diversion, complete with a footway and cycleway, alongside the origin point for the eastern watercourse diversion. This zone is also intended to be utilised for biodiversity net gain (BNG) purposes, containing woodland both new and retained. There is adequate space within this zone to avoid significant disruption of new woodland although the potential environmental impact requires further consideration. Zone 6 is located south of the reservoir at 61 to 70mAOD and is bordered by the railway running along the southern edge.	Favourable – Adequate space, with minimal Tier 1 constraints and low flood risk. Subject to further consideration of environmental impact	Y
7	Zone 7 ranges in width from ~75m to ~655m and primarily consists of infrastructure related to the preferred rail siding option, including a temporary access transfer road. Additionally, the Steventon and East Hanney road diversion, complete with a footway and cycleway, will also	Less Favourable – Increased construction complexity, health and safety and programme / cost risk due to construction congestion and phasing risk. Most of Zone 7 will be allocated for the rail siding and the associated access/transfer road. Although these features are	N

Zone	Characteristics	Favourability	Progress (Y/N)
	traverse Zone 7. It is located south-west and inner west of the site a ~56 to 68mAOD.	temporary, constructing the T2ST WTW during the utilization of the assets would be impractical due to the construction phasing.	
8	Zone 8 comprises the entire proposed reservoir waterbody and its associated embankments with a circumference of ~12.22km. It is located at the heart of SESRO at 54 to 66mAOD. Encircling the base of the embankment will be a network of various trails for visitors to explore.	Discounted – Space occupied by reservoir and embankments. Construction of a WTW within a reservoir would require a floating structure which is not feasible.	N

Source: Thames Water Internal, 2024

3.4 WTW Land Parcel definition

3.4.1 Utilising the constraints map Figure 3.3 in conjunction with favourable zones 3 and 6 indicative land parcels were identified and digitised for consideration as both WTW and construction compound sites. The land parcels will contain either WTW layout 1 or Layout 2 as described in Section 0 below. The remaining land within each land parcel provides increased construction flexibility, for potential landscaping and future expansion.

3.4.2 The land parcels are shown within Figure 4.1as land to be assessed and described below in Table 3.4.

Table 3.4: Land parcels areas

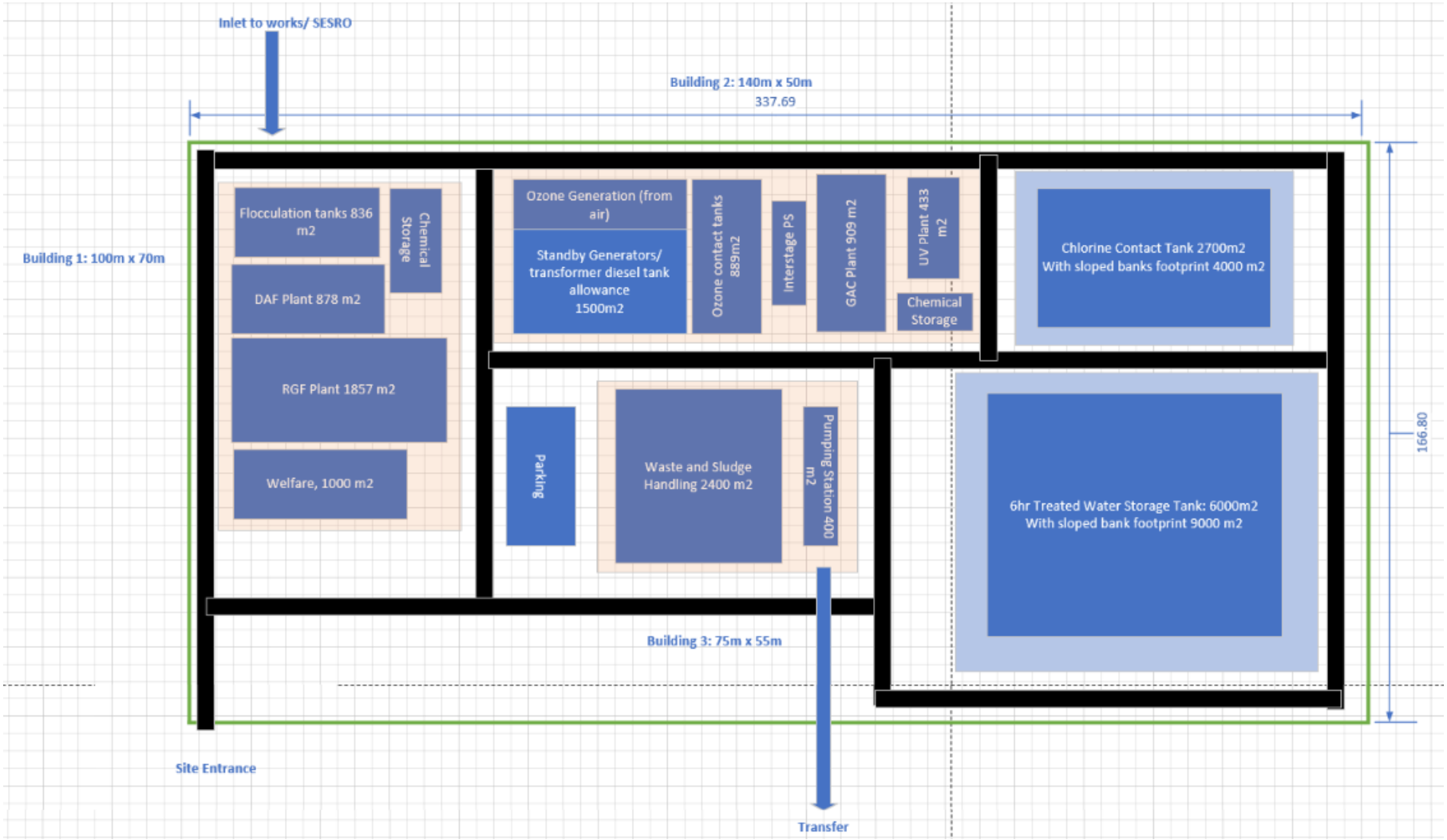
Land parcel ID	Zone ID	Area (Ha)
1	3	19
2	3	14
3	6	14
4	3	29

Source: Thames Water Internal, 2024

3.5 T2ST WTW Layouts

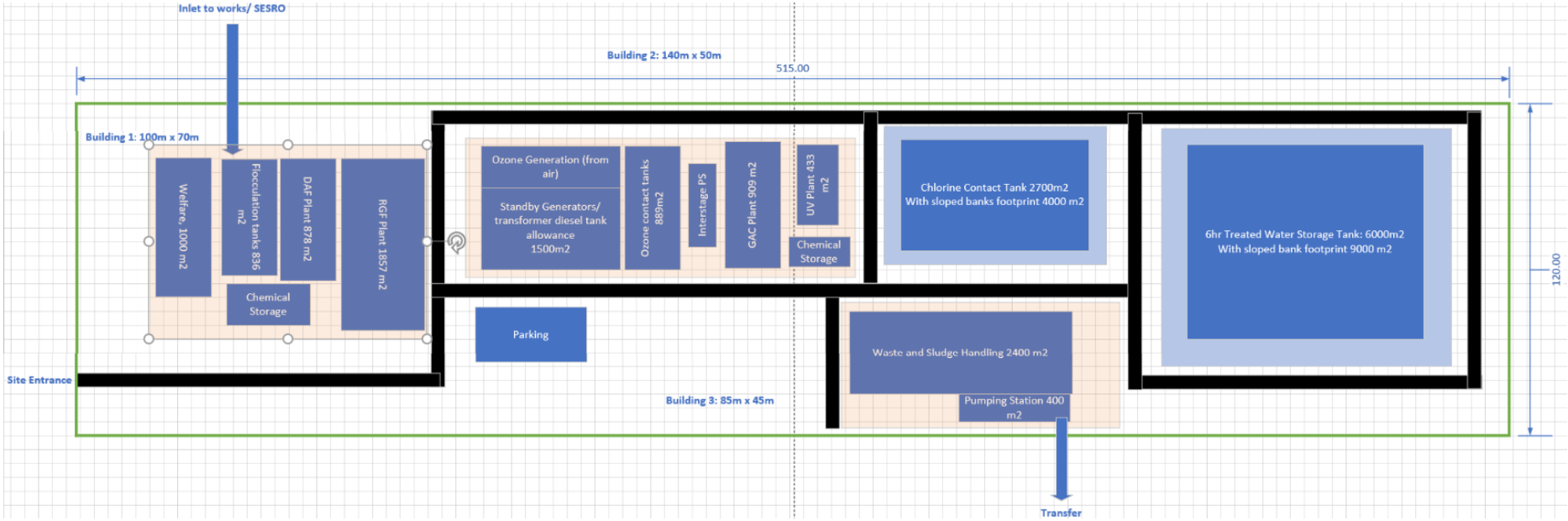
3.5.1 T2ST has provided two indicative layout configurations for a 120Ml/d WTW. Both configurations include a maximum building height of 15m, a 9000m² treated water storage tank, and a 4,000m² chlorine contact tank. The dimensions and layouts are provided as follows: Layout 1 – 338m x 167m (Figure 3.5) and Layout 2 – 515m x 120m (Figure 3.6).

Figure 3.5: WTW Indicative Layout 1



Source: T2ST Project Team

Figure 3.6: WTW Indicative Layout 2



Source: T2ST Project Team

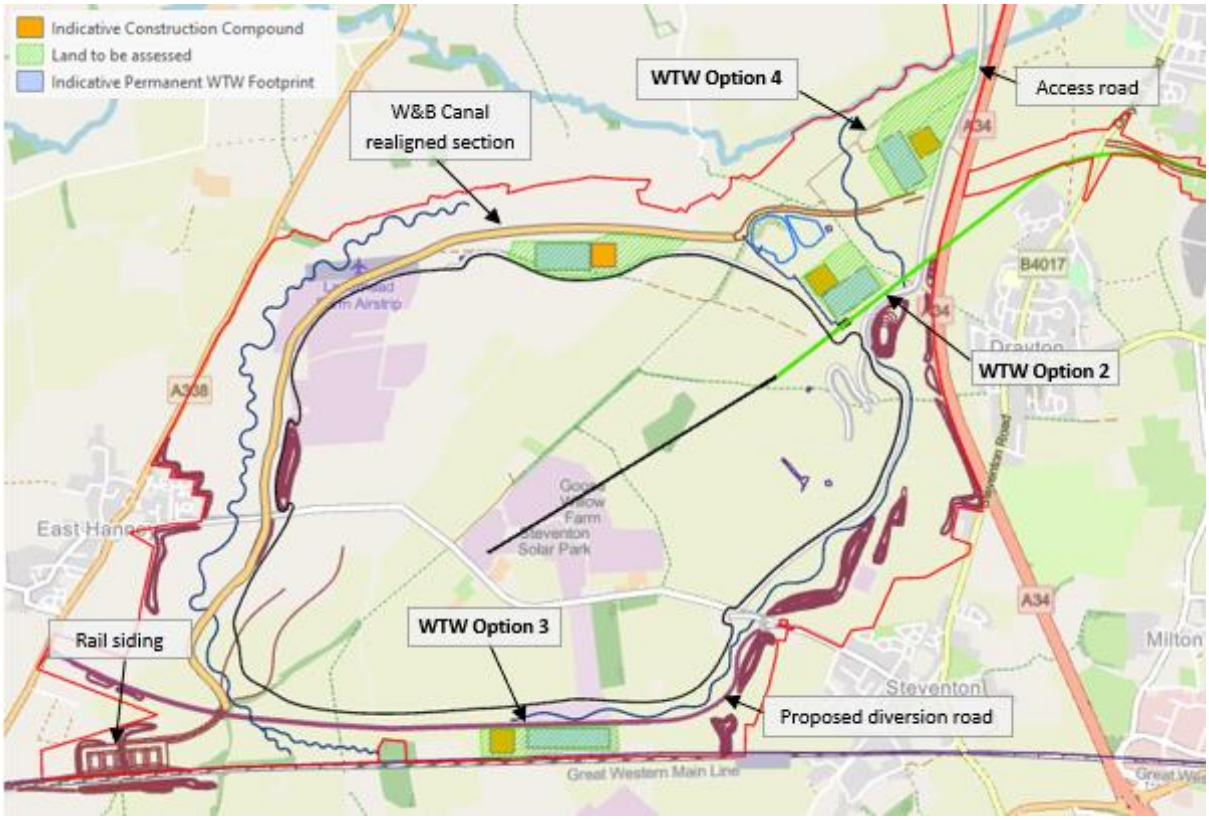
4 Options Definition

This section presents the options developed for the T2ST WTW assessment. The definition of options is appraisal step 4 in the appraisal methodology, as set out in subsection 2.5 of this report.

4.1 Options for T2ST WTW Placement

4.1.1 After completion of the zoning and constraint exercise, four T2ST WTW locations were identified within the Study area and taken forward to Step 5 for individual RAG assessment. The options are described in Sections 4.2 through 4.5.

Figure 4.1: T2ST WTW Options taken forward for further assessment.



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Note: The Study Area Boundary (red line) is as detailed in Section 3.1

4.1.2 Each defined option includes a description of the WTW placement, as well as the corridors associated with the pipelines. There are four primary pipelines linked to the WTW:

- Raw water pipeline (1,000mm dia) – The raw water is supplied to the WTW from the RWPS. This water, used for treatment, is extracted from the SESRO reservoir, which, in turn, receives its supply from The River Thames.
- Contingency pipeline (1,000mm dia) – Utilised for operational[10] and emergency[11] purposes, enabling the discharge of effluent / overflows from the WTW. It serves functions such as handling overflows, out of specification water and tank drain down to facilitate cleaning and repairs.
- Potable water pipeline (1,100mm dia) – The origin of the T2ST potable water transfer pipe is established from the WTW. The potable water pipeline, as evaluated in the options appraisal report, encompasses the section from the WTW to the SESRO study area boundary. The final destination of T2ST lies south of SESRO, and accordingly, the southern boundary of the study area will be utilised as an end point for the potable water pipeline within this assessment. The remainder of the pipeline route will be designed during Southern Waters Gate 3 T2ST design and SESRO backchecking undertaken during subsequent design phases.
- Foul pipeline (200mm) – Utilised to convey WTW sludge/wastewater from the WTW, for disposal at the Abingdon Sewage Treatment Works (STW). For the purposes of this appraisal report, only the foul pipeline within the SESRO study area has been considered. The Abingdon STW lies east of SESRO, and thus, Zones 3 and 5 eastern boundaries (Figure 3.4) will be utilised as an end point for the foul pipeline within this assessment[12]. The remainder of the pipeline route will be designed during Southern Waters Gate 3 T2ST design and SESRO backchecking undertaken during subsequent design phases.

4.1.3 A shared pipeline construction corridor has been assumed for the aforementioned pipelines where appropriate. The objective of this is to minimize excavation and backfill work, thereby reducing both time and costs, as well as lowering carbon emissions.

4.1.4 All options necessitate the potable pipe crossing the railway located to the south of the SESRO site and the foul pipework crossing the A34, as expanded on in Section 5.2.5.

4.1.5 The pipeline corridors have been positioned along the routes of access roads where appropriate. Utilising roads can facilitate easier maintenance access

[10] Discharged within the constraints of an environmental permit where applicable (The Environmental Permitting (England and Wales) Regulations 2016).
[11] These are emergency discharges of trade effluents (water used in production, washing etc.) under the Water Resources Act or Water intended for potable supply – Emergency discharges (under the Water Industry Act).
[12] Future Optioneering may identify that part or all of zone 2 is favourable for the foul pipeline.

whilst minimising disruption to habitats.

4.1.6 The 200mm T2ST foul pipeline has potential for combining with the foul waste produced by SESRO recreational facilities such as cafes and visitor centres. The assessed foul pipeline routes currently consider only foul water from T2ST. However, if a combined foul network is desired, it would likely require an increased pipeline diameter and additional corridor routing assessments to accommodate additional foul sources.

4.2 Option 1

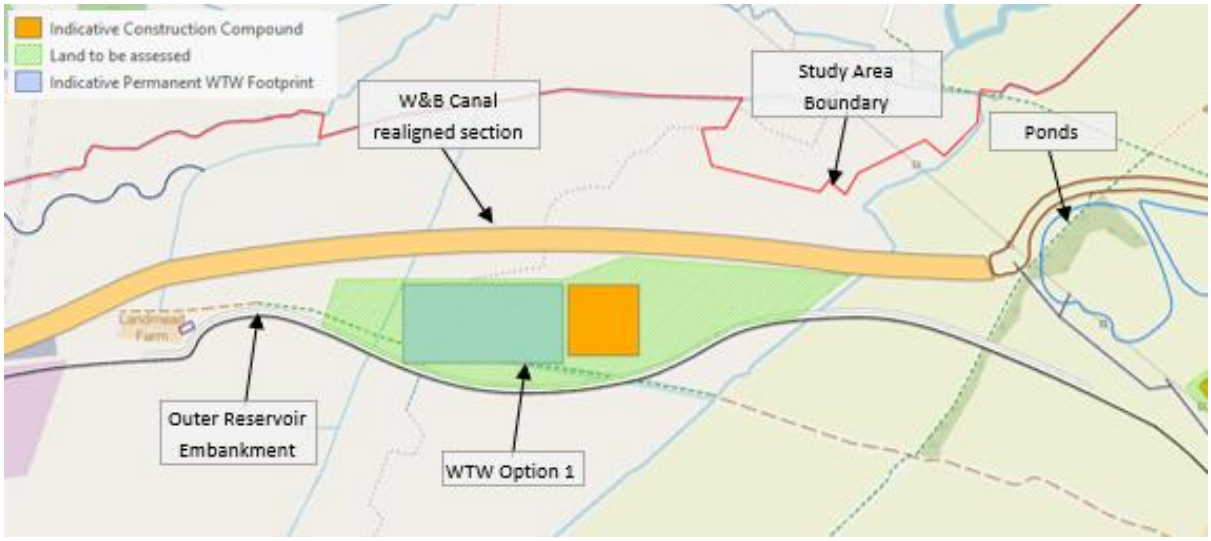
WTW Placement

4.2.1 WTW Option 1 positions the WTW along the northern edge of the outer reservoir embankment, approximately 1,900m south of Marcham (Figure 4.2). The Wilts and Berks Canal corridor lies immediately to the north of this option. Option 1 falls within Zone 3. By avoiding the northeast corner of the site, this option effectively reduces potential interactions with the pumping station, tunnel, recreational facilities associated with lakes, café, and public parking.

4.2.2 The WTW is assumed to be accessed for construction and operational purposes via the main SESRO access road, with a total length from Marcham Road of approximately 6,400m.

4.2.3 The option has been developed based on the dimensions of WTW Option Layout 1, shown in Figure 3.5. WTW Option Layout 2 is also suitable for this land parcel if required, e.g., if the reservoir embankment expanded, thus requiring a width reduction of the WTW.

Figure 4.2: T2ST WTW Option 1 - Placement



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Note: The Interim Landscape and Environmental Master Plan for summer 2024 consultation includes minor changes to the shape of the ponds and other landscape features, which are not material to this WTW study. The Study Area Boundary (red line) is as detailed in Section 3.1

Associated Indicative Pipeline Corridors

4.2.4 The indicative pipeline corridors to and from the WTW for Option 1 are shown in Figure 4.3 below.

4.2.5 Initially, all four pipelines run in parallel upon leaving the WTW for a distance of approximately 1,200m before diverging into two separate corridors.

4.2.6 The indicative potable pipeline corridor, running for approximately 5,000m, follows the operational maintenance access road located around the perimeter of the reservoir. This corridor is deviated slightly when passing through the temporary construction compound in order to avoid clashes with the RWPS.

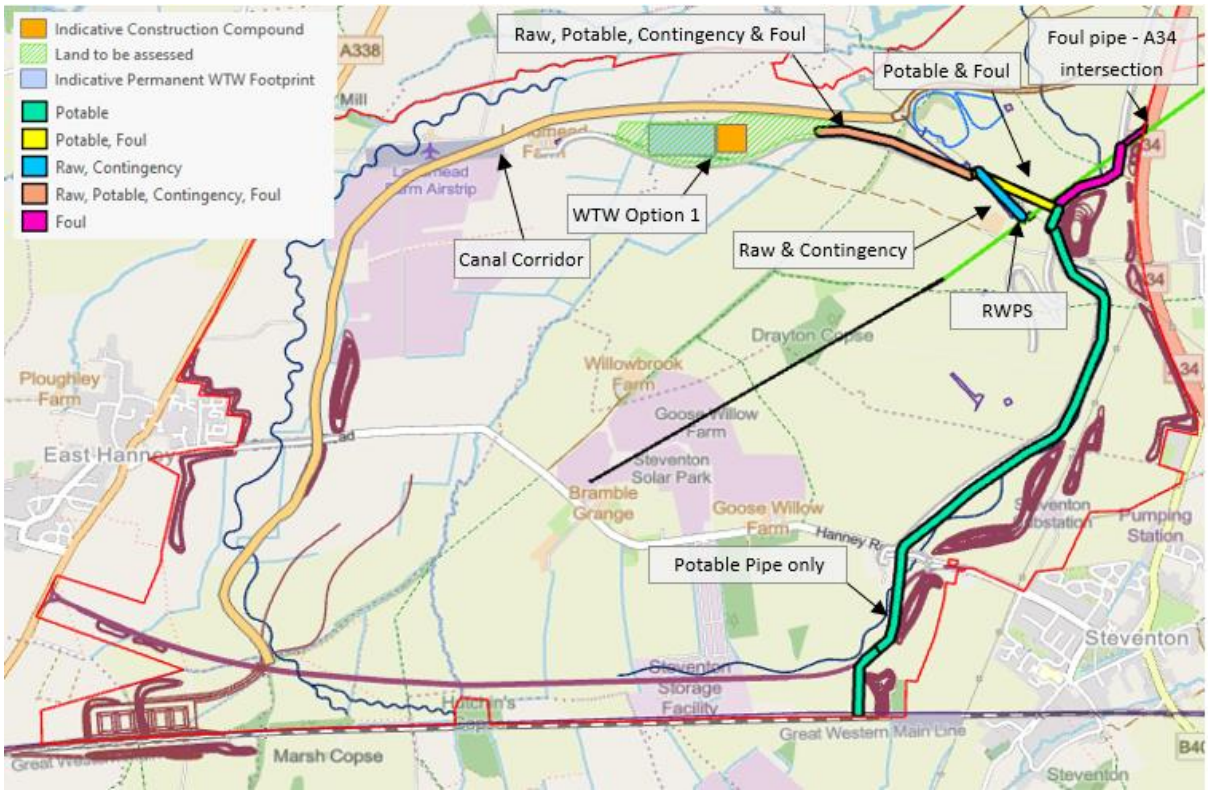
4.2.7 The indicative foul pipeline corridor follows the main SESRO access road for approximately 550m before deviating off to cross the A34. Should the foul pipework be shared with other SESRO facilities the pipeline route may deviate and diameter may increase, as covered in Section 4.1.6.

4.2.8 The indicative corridor that houses the four pipelines will intersect with the potential ADC and associated sweetening flow pipework. Therefore, the pipeline would need to be installed prior to construction of the ADC and be tunnelled at the crossing point to facilitate maintenance needs. Furthermore, the foul and potable pipeline intersect with the temporary construction compound before crossing the conveyance tunnel. The foul and potable pipes require a crossing of the A34 and railway respectively, as covered previously.

4.2.9 The eastern watercourse diversion (EWD) is crossed at two separate locations. Firstly, the small diameter foul pipe crosses the EWD in the north-east corridor. Secondly, the large diameter potable pipeline crosses the EWD to the south. The pipelines would likely need to be installed prior to construction of the EWD. Further details on pipeline interactions with the EWD are presented in Section 5.2.12.

4.2.10 The raw, potable, contingency and foul indicative corridor crosses a new buried 132kV electrical main before sharing the corridor with the cable for approximately 600m. The potable pipeline continues to follow the electrical main for a further 1,200m in which an additional crossing between the pipeline and electrical main is required. The foul corridor crosses the retained gas main before the A34 crossing. The foul corridor also crosses a new water main which runs perpendicular to the conveyance tunnel. The potable main shares a corridor with an 11kV electrical main for approximately 450m before crossing over each other. Finally, the potable pipeline crosses a different separate gas main before the railway.

Figure 4.3: T2ST WTW Option 1 - Indicative Pipeline Corridors



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Note: The Study Area Boundary (red line) is as detailed in Section 3.1

Table 4.1: Approximate Pipeline Lengths – WTW Option 1

Pipeline	Approximate Length (m)
Raw	1,650
Contingency	1,650
Potable	5,000
Foul	1,950

Source: Thames Water Internal, 2024

4.3 Option 2

WTW Placement

4.3.1 WTW Option 2 positions the WTW within the northeast corner of the Study area, approximately 700m west of Drayton (Figure 4.4). This location places the

works near the reservoir embankment, the main access road, the pump house, and the tunnel. Notably, Option 2 falls within Zone 3 and effectively consolidates the majority of SESRO operational assets within a single region of the Study area.

4.3.2 The WTW is assumed to be accessed for construction and operational purposes via the main SESRO access road, with a total length from Marcham Road of approximately 4,000m.

4.3.3 The option has been developed based on the dimensions of WTW Option Layout 1, shown in Figure 3.5. WTW Option 2 would not fit within this land parcel unless the ADC is omitted, and the land parcel extended.

Figure 4.4: T2ST WTW Option 2 - Placement

Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

Note: The Interim Landscape and Environmental Master Plan for summer 2024 consultation includes minor changes to the shape of the ponds and other landscape features, which are not material to this WTW study. The Study Area Boundary (red line) is as detailed in Section 3.1

Associated Indicative Pipeline Corridors

4.3.4 The indicative pipeline corridors to and from the WTW for Option 2 are shown in Figure 4.5 below.

4.3.5 The proximity of this option to the RWPS minimises the length of raw and contingency pipeline, providing the most direct route from the WTW to the pump house.

4.3.6 The indicative potable pipeline corridor is shared with the indicative foul pipeline route for approximately 150m before splitting off into their own non shared pipeline corridors. The indicative potable pipeline corridor runs for approximately 3,550m, following the operational maintenance access road located around the perimeter of the reservoir.

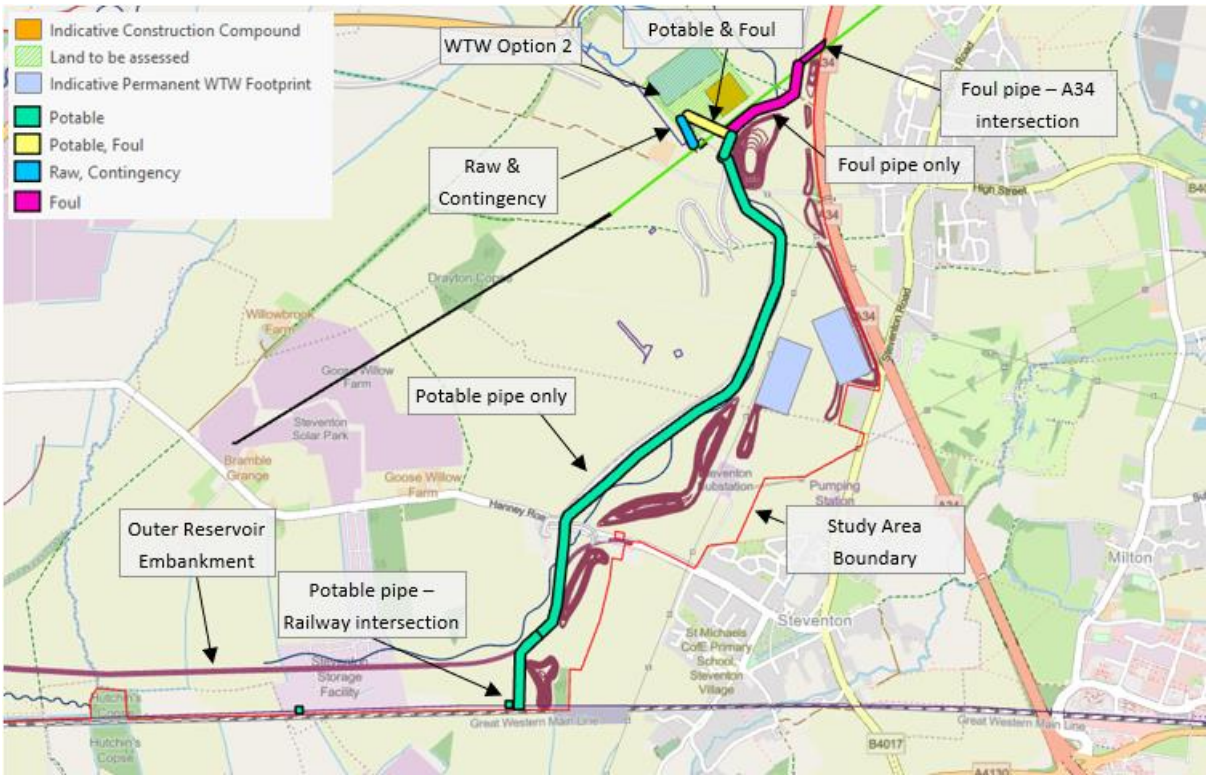
4.3.7 The indicative foul pipeline corridor follows the main SESRO access road for approximately 550m before deviating off to cross the A34. Should the foul pipework be shared with other SESRO facilities the pipeline route may deviate and diameter may increase, as covered in Section 4.1.6.

4.3.8 The indicative corridor that houses the potable and foul pipelines requires a crossing of the conveyance tunnel. The foul and potable pipes require a crossing of the A34 and railway respectively, as covered previously.

4.3.9 The EWD is crossed at two separate locations. Firstly, the small diameter foul pipe crosses the EWD in the north-east corridor. Secondly, the large diameter potable pipeline crosses the EWD to the south. The pipelines would likely need to be installed prior to construction of the EWD. Further details on pipeline interactions with the EWD are presented in Section 5.2.12.

4.3.10 The indicative potable pipeline corridor crosses a new buried 132kV electrical main before sharing the corridor with the cable for approximately 1200m. The foul corridor crosses the retained gas main before the A34 crossing. The foul corridor also crosses a new water main which runs perpendicular to the conveyance tunnel. The potable main shares a corridor with an 11kV electrical main for approximately 450m before they cross over each other. Finally, the potable pipeline crosses an additional gas main before the railway.

Figure 4.5: T2ST WTW Option 2 - Indicative Pipeline Corridors



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Note: The Study Area Boundary (red line) is as detailed in Section 3.1

Table 4.2: Approximate Pipeline Lengths – WTW Option 2

Pipeline	Approximate Length (m)
Raw	150
Contingency	150
Potable	3,550
Foul	800

Source: Thames Water Internal, 2024

4.4 Option 3

WTW Placement

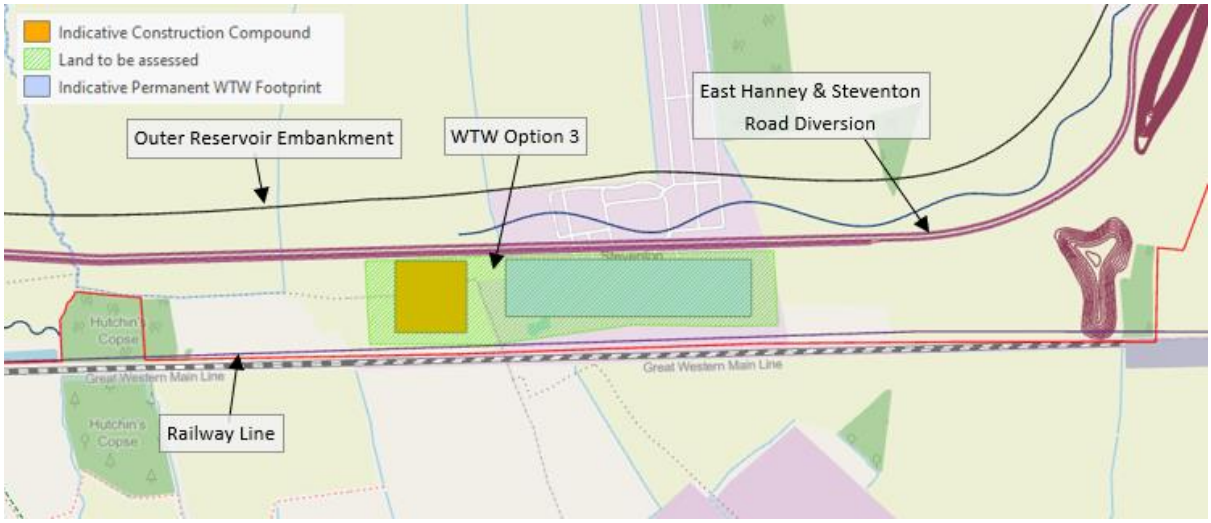
4.4.1 WTW Option 3 places the works on the southern edge of the Study area, approximately 1,600m west of Steventon (Figure 4.6). This location positions the WTW within a narrow corridor of land situated between the Great Western main railway line and the Steventon to East Hanney road diversion. Notably, this option avoids the northeast corner of the site, effectively minimizing interactions with recreational facilities and public parking.

4.4.2 The land is currently used as a commercial warehousing and open storage facility under the name of Steventon Depot. Before this, there is evidence of an abandoned sewage treatment works, military accommodation and a rail siding.

4.4.3 Access to the WTW during construction is assumed to be via the main SESRO access road, with a total length from Marcham Road of approximately 8.1km. For operational purposes, direct access would be achieved from the Steventon and to Easy Hanney road diversion.

4.4.4 The option has been developed based on the dimensions of WTW Option Layout 2, shown in Figure 3.6. WTW Option 1 would not fit within this land parcel due to the restricted width of the parcel, bordering both the railway and Steventon to East Hanney road diversion. It may be feasible to reroute the watercourse and road diversion to create additional space.

Figure 4.6: T2ST WTW Option 3 - Placement



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Note: The Study Area Boundary (red line) is as detailed in Section 3.1

Associated Indicative Pipeline Corridors

4.4.5 The indicative pipeline corridors to and from the WTW for Option 3 are shown in Figure 4.7 below.

4.4.6 The proximity of this option away from the RWPS and Abingdon STW increases the overall length of raw, contingency and foul pipework lengths required, however, offers a reduction in required potable pipework.

4.4.7 The raw, contingency and foul pipework share an indicative corridor for approximately 3,500m before the foul pipework deviates off to the STW. The indicative shared corridor follows the Steventon to East Hanney road diversion and the SESRO operational access road.

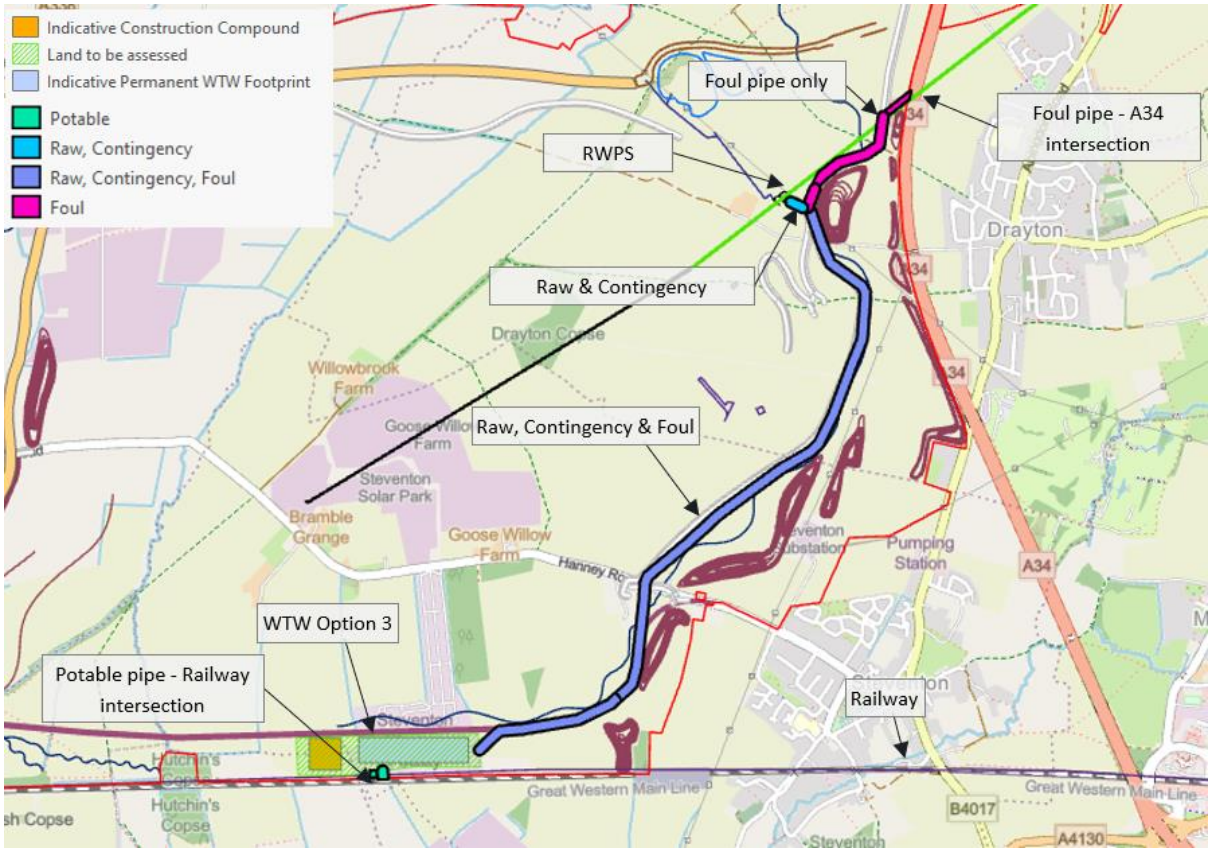
4.4.8 The foul pipeline deviation from the main corridor follows the main SESRO access road for approximately 550m before deviating off to cross the A34. Should the foul pipework be shared with other SESRO facilities the pipeline route may deviate and diameter may increase, as covered in Section 4.1.6.

4.4.9 The indicative corridor that houses the foul pipeline requires a crossing of the conveyance tunnel. The foul and potable pipes require a crossing of the A34 and railway respectively, as covered previously.

4.4.10 The EWD is crossed at two separate locations. Firstly, the raw, contingency and foul pipeline corridor crosses the EWD to the south. Secondly, the foul pipe crosses the EWD again in the north-east corridor. Further details on pipeline interactions with the EWD are presented in Section 5.2.12.

4.4.11 The raw, contingency and foul pipeline corridor is shared with an 11kV buried electrical for approximately 950m. This corridor is also shared with an 132kV electrical buried main for approximately 1200m before a crossing is required. The foul corridor crosses the retained gas main 100m before the A34 crossing. The foul corridor also crosses a new water main which runs perpendicular to the conveyance tunnel.

Figure 4.7: T2ST WTW Option 3 - Associated Pipelines



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Note: The Study Area Boundary (red line) is as detailed in Section 3.1

Table 4.3: Approximate Pipeline Lengths – WTW Option 3

Pipeline	Approximate Length (m)
Raw	3,700
Contingency	3,700
Potable	100
Foul	4,600

Source: Thames Water Internal, 2024

4.5 Option 4

WTW Placement

4.5.1 WTW Option 4 positions the WTW near the entrance of the Study area,

approximately 600m northwest of Drayton. This location is within a relatively spacious land parcel, situated 1,000m northeast of the reservoir. However, the localised higher elevation of this section of the site would likely require landscape mitigation and additional earthworks to reduce the visual impact of a WTW and integrate it into the landscape.

4.5.2 The WTW is assumed to be accessed for construction and operational purposes via the main SESRO access road, with a total length from Marcham Road of approximately 4,000m.

4.5.3 The option has been developed based on the dimensions of WTW Option Layout 1, shown in Figure 3.5. However, the land parcel assessed within Option 4 would cater to both layouts with ease.

Figure 4.8: T2ST WTW Option 4 - Placement

Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

Note: The Interim Landscape and Environmental Master Plan for summer 2024 consultation includes minor changes to the shape of the ponds and other landscape features, which are not material to this WTW study. The Study Area Boundary (red line) is as detailed in Section 3.1

Associated Pipeline Corridors

4.5.4 The indicative pipeline corridors to and from the WTW for Option 4 are shown in Figure 4.9 below.

4.5.5 A corridor comprised of all 4 pipelines is present for Option 4 although only runs for approximately 150m before the foul pipework splits off to cross under the

A34.

4.5.6 The raw, contingency and potable pipeline route follow the main SESRO access road for approximately 1,100m before the raw and Contingency pipework split off into a separate corridor into the RWPS.

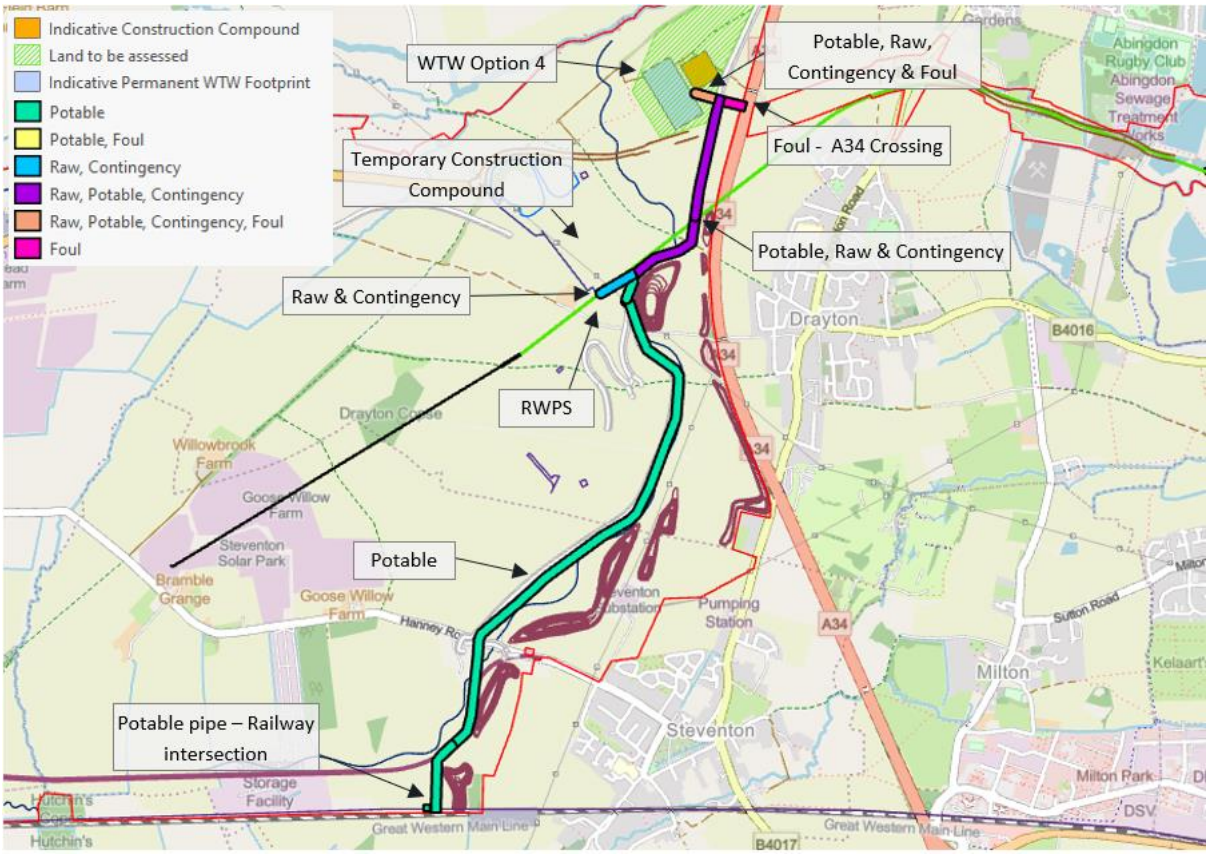
4.5.7 The potable pipeline corridor, running for approximately 4,600m, follows the remainder of the route via the operational maintenance access road located around the perimeter of the reservoir.

4.5.8 The indicative corridor that houses the raw, contingency and potable pipelines will intersect with the potential ADC. Therefore, the pipelines would need to be installed prior to construction of the ADC and be tunnelled at the crossing point to facilitate maintenance needs. This crossing point is shared with a planned gas utility diversion. This indicative corridor then requires crossing the conveyance tunnel. The conveyance tunnel crossing could be avoided for the raw and contingency pipework, although would require a deviation away from the main access road and potable corridor presenting additional maintenance and construction challenges. The foul and potable pipes require a crossing with the A34 and railway respectively, as covered previously.

4.5.9 The EWD is crossed at two separate locations. Firstly, the raw, contingency and potable pipeline corridor crosses the EWD in the north-east corridor. Secondly, the potable pipe further crosses the EWD to the south of the site. Further details on pipeline interactions with the EWD are presented in Section 5.2.12.

4.5.10 The raw, contingency and potable pipeline corridor is shared with a new gas main for approximately 100m, whilst crossing the ADC. This corridor also requires a crossing with a new water main. The foul corridor crosses with the retained gas main 100m before the A34 crossing. This potable corridor is shared with an 132kV electrical buried main for approximately 1200m before a crossing is required. The potable main further shares a corridor with an 11kV electrical main for approximately 450m before crossing. Finally, the potable pipeline crosses a different separate gas main 250m before the railway.

Figure 4.9: T2ST WTW Option 4 - Associated Pipelines



Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

Note: The Study Area Boundary (red line) is as detailed in Section 3.1

Table 4.4: Approximate Pipeline Lengths – WTW Option 4

Pipeline	Approximate Length (m)
Raw	1,400
Contingency	1,400
Potable	4,600
Foul	300

Source: Thames Water Internal, 2024

5 Option Assessments

This section summarises the option assessments undertaken for the WTW and associated pipeline and construction compounds. The section starts by outlining the assumptions taken in the assessments, before individually summarising the performance of each option when assessed; therefore, this section is a summary of appraisal step 5 (undertake individual assessments).

5.1 Introduction

5.1.1 The following sections describe the assumptions and output of the option appraisal for the following assessment themes:

- Engineering (Construction and Operation)
- Cost and Carbon
- Environment
- Community, Planning and Land

5.1.2 Section 5.2 details the assumptions made in the assessment process. Further details of the option assessment against individual criteria are provided in Sections 5.3 to 5.6.

5.2 Assessment Assumptions

5.2.1 The assessments have been made based on a variety of assumptions which are detailed in the following sections. These assumptions have been based on a variety of conditions of which some are confirmed, and others are dependent on other options appraisals or future and ongoing work. There will thus be back checking of the assumptions in the future if new / conflicting / different information becomes available.

5.2.2 The assumptions have been subdivided into the themes as described in Section 5.1.1.

General assumptions

5.2.3 These are a group of assumptions that have been made regarding the whole site and are applicable to more than one of the themes.

5.2.4 The key assumptions include:

- It is assumed that the WTW and pipelines will be located within land purchased by Thames Water for the purposes of constructing SESRO.

- The Gate 2 indicative construction programme for the T2ST WTW[13] and associated pipework are interconnected with Gate 2 indicative construction programme for SESRO. Currently some activities for the T2ST and SESRO will need to be carried out concurrently. The T2ST pipeline installation is proposed to start in the third quarter of 2030 and be completed alongside the SESRO watercourse diversions, prior to the T2ST WTW mobilisation and construction commencing in the first quarter of 2034. The T2ST WTW is due to be commissioned in 2038, however, this is dependent on SESRO's commissioning and the associated provision of raw water. The projected water into supply date is January 2040. A summary of the construction phasing can be found in Table 5.1 below. It should be noted that this programme is preliminary and subject to revision a development of both projects develops.

Table 5.1: Assumed construction phasing for the WTW and associated pipework

Construction phase	Duration	Start	Finish
SESRO Watercourse Diversion	15 months	Q2 2030	Q2 2031
T2ST Pipelines delivered by SESRO	15 months	Q3 2030	Q3 2031
T2ST Mobilisation/ site set up	6 months	Q1 2034	Q2 2034
T2ST WTW Construction	42 months	Q3 2034	Q4 2037
SESRO Commissioning	26 months	Q4 2035	Q1 2038
T2ST Commissioning works	12 months	Q1 2038	Q4 2038
T2ST Risk allowance	12 months	Q1 2039	Q4 2039
WTW operation		January 2040	

Source: Thames Water Internal, 2024

- Table 5.1 above assumes that portion of T2ST pipeline within the SESRO boundary will be delivered by SESRO and the WTW by T2ST. However, it should be noted that the split of construction ownership for assets belonging to T2ST has not yet been determined and is not covered within this report.
- It is assumed that the T2ST WTW treatment design is the same for all options, the T2ST SRO owns this design. The WTW footprints used in the appraisal are detailed in Table 2.1 above based on indicative WTW layouts provided by T2ST referred to in Section 3.4.1. It is assumed that the supplied size layout includes all facilities required for the WTW to be fully operational. Also, all WTW assets are independent to SESRO assets.

[13]https://www.thameswater.co.uk/media-library/home/about-us/regulation/regional-water-resources/water-transfer-from-thames-water-to-southern-water/gate-2-reports/T2ST-RAPID-Gate-2-Report.pdf

- The T2ST WTW temporary working area / contractors compound footprint has been considered as 150m x 150m.
- All the appraised land parcels are assumed to be outside of the post SESRO flood zones.
- The SESRO reservoir embankment height ranges between 15m to 25m above ground level.
- The current preferred location for the main SESRO construction compound is the same as Option 2's proposed location and would therefore need to be relocated if Option 2 is progressed.

Engineering Assessment Assumptions

5.2.5 The following engineering assumptions informed the assessment. Further design development would be undertaken for the preferred solution to confirm the approach to these issues.

- Ground conditions and ground water levels are assumed to be generally uniform across the indicative location for SESRO. At the time of the appraisal, the ground information available, including contamination levels, confirm this uniformity across the study area.
- It is assumed that there are no variations in ground conditions / ground water level (if any) that would merit different construction methods. For example, piled foundations to prevent settlement of structures would not be necessary. Also, there would be no need for additional weight to prevent any underground tanks from floating when empty.
- It is assumed that significant land profiling shall be conducted to construct the reservoir; therefore, it is assumed that any buildings or structures requiring demolition to facilitate construction of the WTW will have already been demolished as a result of the reservoir construction.
- It is assumed that unexploded ordnance (UXO) threat would be mitigated for the entire study area prior to any mobilisation or construction work.
- The ex-Ministry of Defence (MOD) site (located on the South side of the Study area) is assumed to require full site clearance, it is therefore assumed that there is no opportunity to reuse existing assets to reduce the amount of construction required.
- At this stage the rail network and proposed siding have not been considered for transportation associated with the WTW construction. It is assumed construction materials, plant, staff, etc. shall be transported to the WTW site from the North, via Marcham road and the A34.
- Additional access requirements are assumed to be the same across all options.
- A haul road along the toe of the reservoir shall be installed, which would serve as shared construction access for the SESRO and T2ST SROs.
- The WTW is assumed to have a dual power supply i.e., no backup generator.

- Operation and maintenance requirements and complexity within the WTW are similar for all options, irrespective of the location.
- As the intake / source water is the same for all options (i.e., gravity fed from the reservoir), it is assumed that the water quality to the WTW is the same.

5.2.6 The operation of the pipelines is presumed to be guided by the following assumptions:

- At this stage all SESRO and T2ST pipework is assumed to be separate, for example, no shared foul sewer between SESRO and T2ST.
- It is assumed that pipeline crossings associated with existing / new watercourses within the indicative SESRO site shall be constructed in advance of any SESRO watercourse diversions.
- It is assumed that there are four different types of pipelines associated with the WTW. They are summarised in Table 5.2 below.

Table 5.2: List of pipelines associated with the WTW

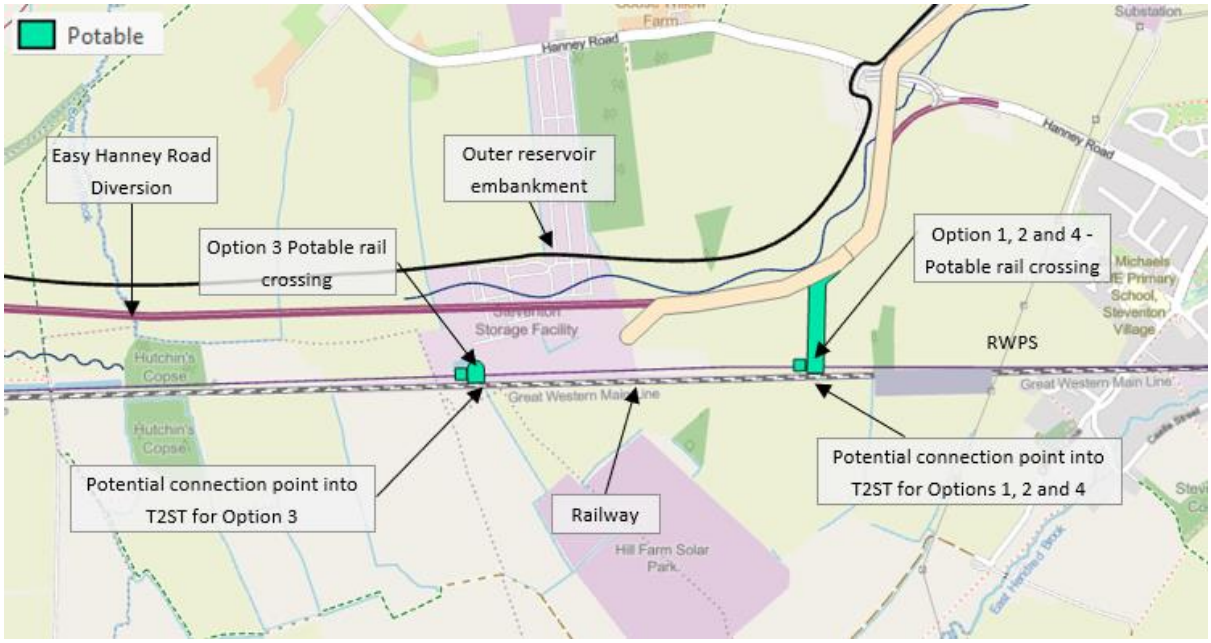
Pipeline	Diameter (mm)	Material
Raw water transfer	1,000	Welded steel
Contingency / commissioning discharge	1,000	Welded steel
Potable water transfer	1,100	Welded steel
Foul / sludge sewer	200	High density polyethylene (HDPE)

Source: Thames Water Internal, 2024

- WTW surface water design is assumed to include onsite attenuation for the buildings, tanks, roads, and car park areas such that maximum run-off is limited to the greenfield run off equivalent of 7 l/s per hectare. A small diameter gravity pipeline (circa 150mm diameter) is assumed to be required to discharge that flow rate into a local on-site watercourse.
- The working strip for the pipeline is assumed to be 50m wide and will host all four pipes (where required).
- It is assumed pipelines or sleeves at crossings will be installed early in the SESRO programme, prior to finalising construction of access roads and the watercourse diversions.
- The construction method for the pipelines is assumed to be cut and cover method, at ~1m (to crown) below ground level.
- The WTW raw water and contingency pipework is assumed to enter the RWPS at ~1m (to crown) below ground level, i.e., there is no requirement to enter the RWPS at a significant depth.

- Steel pipework will require cathodic protection, this is expected to be an induced current system, this may require buried anode beds at 10-20km intervals along the pipe route depending on the soil resistivity. If an anode bed is required at SESRO this would likely be located within the WTW footprint (and would be buried).
- The crossing of the railway line shall be undertaken by the T2ST SRO, the principles of which are set out below.
  - Launch pit for the pipe jack is assumed to be on the southern side of the railway.
  - The reception area on the northern side of the railway is assumed to have a working area of approximately 1,125m^2.
  - The concrete access shaft within the reception area is assumed to have an internal diameter of 6m.
  - It is assumed that the shaft be backfilled and the surface reinstated and grassed over following installation and testing of the water pipeline.
  - On completion, it is assumed that the only surface feature at the pipe crossing would be surface manhole covers on each side of the crossing for air valves and washout chambers – circa 1.5-2.0m diameter with steel man access covers.
  - It is assumed that irrespective of the placement location within the study area, the potable pipeline from the WTW necessitates crossing the railway, and the foul pipe crosses the A34.
- The potable pipeline and associated lengths have only been assessed from the WTW to the boundary of the SESRO study area at the railway crossing.
  - The location of the railway crossing will be dependent on the WTW location as indicated in Figure 5.1. The railway crossing will comprise the installation of a tunnelled sleeve beneath the railway through which the T2ST potable main will be laid.
  - T2ST provided the indicative Gate 2 T2ST potable pipeline route in January 2022. Based on this route it is assumed that the T2ST potable pipeline will enter the SESRO site from the southern boundary of zone 6 crossing the Great Western Main Line (zones defined in Figure 3.4 above). Figure 5.1 below shows the assumed potable water pipeline entry / connection points into the study area via a tunnelled railway crossing.

Figure 5.1: Potential SESRO Connection Points into the T2ST potable pipeline



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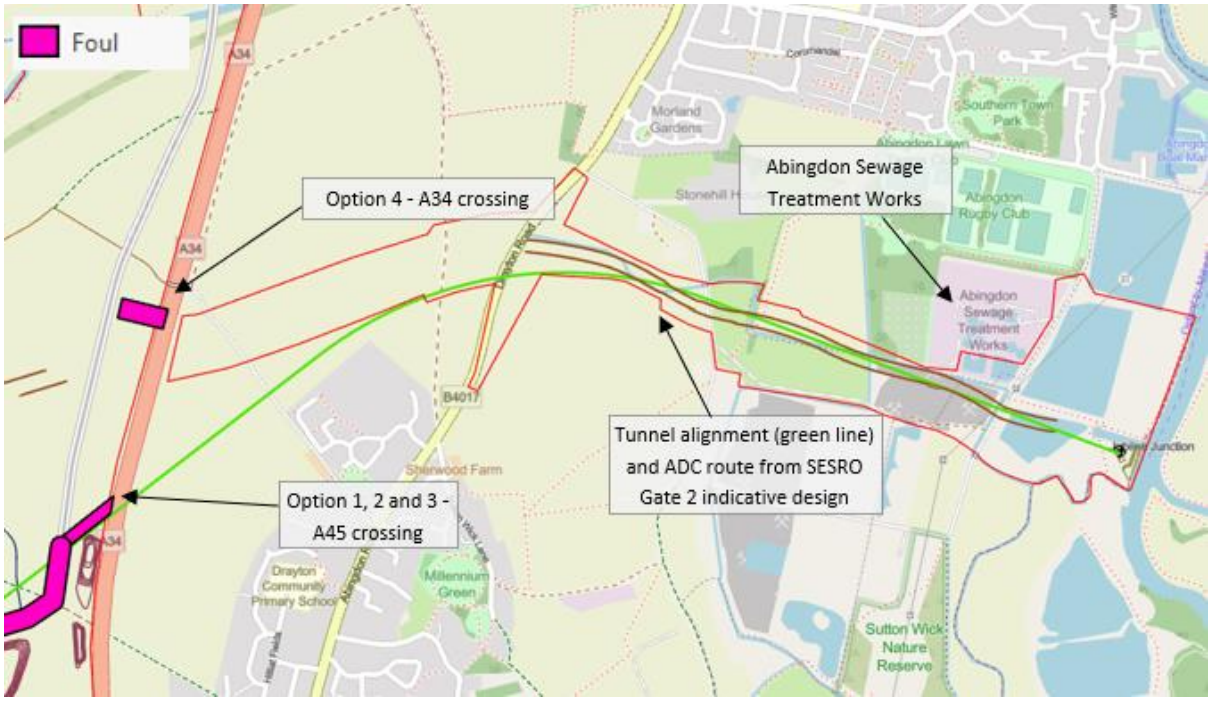
- As stated in Section 4.1 above the indicative foul pipeline and associated lengths have been assessed from the WTW to the eastern boundary of the study area (Zones 3 and 5 - Figure 3.4 above). Figure 5.2 below illustrates the projected intersection of the foul pipeline with the study area boundary and its crossing of the A34. This assumption is based on the termination of the foul pipeline at the Abingdon STW.

Figure 5.2: Foul pipeline extents and Abingdon Sewage Treatment Works location.



Source: Esri, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and affiliates Esri Community Maps contributors. Map player by Esri.

Note: The Study Area Boundary (red line) is as detailed in Section 3.1

- During normal operation, the raw water pipeline to the WTW is assumed to be gravity fed from the reservoir. Backup pumping may be required, which is assumed to be housed in the SESRO RWPS.
- The lowest reservoir tower draw-off point and worst-case scenario in terms of raw water delivery head from the reservoir is assumed to be ~51mAOD, anything below this level would result in no water being available for the WTW. Top water level in the reservoir is assumed to be 79mAOD.
- Discharges from the contingency / commissioning discharge pipeline is assumed to be into the wet well of the RWPS.
- The maximum water level in the RWPS wet well is assumed to be 55mAOD, this is assumed to be the worst-case head that a WTW contingency flow into the RWPS wet well would need to overcome.
- Foul and WTW waste streams are assumed to discharge to Abingdon STW via a separate single pipeline.
- Surface water management on the WTW has been based on the assumptions that surface water shall be managed within the WTW site via sustainable drainage systems (SUDS).

Cost and Carbon Assessment Assumptions

5.2.7 At this stage the total expenditure (TOTEX) and carbon footprint of the treatment works is assumed to be uniform across all options. The major cost and carbon emissions differentiator is therefore associated with the pipelines to and from the site (as the different options have different pipe lengths requirements), including any additional interstage pumping requirements.

5.2.8 The unit cost and embodied carbon for the pipelines used in this appraisal have been provided by the T2ST team and are summarised in the Table 5.3 below:

Table 5.3: Unit cost and embedded carbon per until length of pipeline

Pipeline	Cost (£ per m)	Embodied carbon ($kgCO_2e$ per m)
1100mm diameter welded steel	5,123	586.6
1000mm diameter welded steel	4,603	496.4
200mm diameter HDPE	1,908	57.0

Source: T2ST Team

5.2.9 It is assumed that the WTW is fully funded by the T2ST SRO. Synergies with the SESRO project are based on the WTW being sited in within the SESRO boundary, and raw water being supplied by the SESRO reservoir.

Environmental Assessment Assumptions

5.2.10 Several topics for the environmental assessment were considered individually. The following assumptions informed the assessment:

5.2.11 Air Quality

- Potential dust-generating activities during the construction phase can effectively be managed using standard best practices.

5.2.12 Aquatic Environment

- The alignment, and any features, of the EWD cannot be compromised due to the construction of the pipeline as this is a requirement for Water Framework Directive compliance. It is assumed that the EWD will need to be constructed as part of the early works associated with SESRO and cannot be disturbed once it has been completed.
- Where the pipeline crosses the EWD corridor, it is assumed a pipe sleeve will be installed prior to the construction of the EWD. Subsequently the pipeline will be inserted through the sleeve, thus avoiding disruption to the aquatic environment. An appropriate fill would need to be installed on top of the pipe sleeve, if it is open cut, to ensure that EWD could be constructed appropriately. The preference is that the pipeline be located outside the

corridor of the EWD so that it avoids any challenges associated with WFD compliance.

- Any impact on other watercourses or ditches within SESRO will also need to be mitigated.
- The EWD requires a corridor width of 30m to realise the required Water Framework Directive (WFD) Compliance and BNG benefits.

5.2.13 Biodiversity and Nature Conservation

- It was assumed that the Ancient Woodland Inventory and Ancient Tree Inventory was correct and comprehensive at the time of the optioneering process (summer 2023). The latter will need to be confirmed once land access is available and surveys can be carried out to confirm the desktop data.
- The assessment of habitats to be impacted was undertaken using aerial imagery and UK Habitat information collected in advance of Gate 2, the latter of which was collected using desk study information and aerial imagery and has not been fully ground truthed.
- There is a 10% biodiversity net gain (BNG) required for the T2ST SRO, this shall be achieved either within the WTW footprints as noted in Table 2.1 or outside the remainder of the study area.

5.2.14 Historic Environment

- The existing publicly available data regarding buried archaeology is not complete and is subject to further desk study and non-intrusive and intrusive surveys to understand the presence, extent and value of buried remains.

5.2.15 Land

- Data provided by third parties, including historical maps to undertake the assessment are accurate.

5.2.16 Landscape and Visual

- Construction works would largely be undertaken during the daytime, but some lighting could be required for occasional night-time working.
- Infra-red security lighting would be required during operation.
- WTW would be up to 15m high above the existing ground level. The architectural finish of the buildings, including the roof, would be appropriate to the location but is not yet defined.
- Mitigation planting could be implemented, unless there is a constraint noted that could prevent this.

5.2.17 Noise

- Professional judgement, informed by published guidance (such as BS5228, LA 111, BS4142, BS8233 and WHO Night Noise Guidelines for Europe),

and experience of other relevant schemes, has been used to assess potential operational and construction impacts.

- It is assumed that well established mitigation measures will be put into place as required.
- Property counts do not consider the screening of receptors by nearby buildings (i.e., noise screening for the second row of properties is not considered due to the presence of the first row of properties).

Community, Planning and Land Assessment Assumptions

5.2.18 The assessment was considered in several themes: Community, Planning and Property and Land. The following assumptions informed the assessment:

5.2.19 It is assumed that there is no permanent or temporary loss of sensitive properties for all the options being appraised. In addition, it is also assumed that the WTW location options are not associated with any loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e., residential, historical or community assets.

5.2.20 All Public Rights of Way (PRoW) affected by the development will be re-routed / reinstated.

5.3 Option 1

5.3.1 This section summarises the performance of WTW Option 1 considering the appraisal themes and subthemes. For full details of the assessment of WTW Option 1 against individual criteria refer to Appendix A. The placement of Option 1 is shown in Figure 4.2 while the associated pipeline corridors are shown in Figure 4.3.

Engineering (Constructability) Performance

5.3.2 Option 1 construction activities which are noteworthy from a health and safety perspective and would increase the risk of endangering workers are the tight working corridor and the railway border to the south. While working near an operating railway inherently increases risk, it is a necessary requirement for all available options to facilitate the potable pipe rail crossing.

5.3.3 Option 1 construction activities which are noteworthy from a health and safety perspective and could increase the risk of endangering workers involved in the laying of pipelines: potable pipeline which will have interactions with the rail crossing and the foul pipeline which will have interactions with the A34 road. These may require enhanced control measures during construction.

5.3.4 Construction complexities are introduced as Option 1's pipeline corridor demands that all pipework (potable, raw, contingency, and foul) cross the alignment of the sweetening flow pipework for SESRO (based on the Gate 2

indicative design). In addition, the potable and foul pipeline corridor crosses the line of the SESRO conveyance tunnel.

5.3.5 With regards to third party impacts, the potential disruption to the existing road network associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movement required for the WTW, and pipeline construction is expected to moderately impact the A34 and Marcham Road. The reserved corridor for the Wilts and Berks Canal crosses through Option 1. Should a WTW be established in this area, it might necessitate the realignment of the proposed canal corridor within the Interim Master Plan as depicted in Figure 4.2 above, which could, in turn, affect the planned SESRO flood compensation strategy. Nevertheless, a tailored site specific WTW design, refined during the design phase, could reduce or even eliminate these concerns.

5.3.6 Option 1 has moderate interdependencies with the main SESRO programme. Its proximity to the reservoir embankment and associated features introduces potential programme risks. For instance, if the embankment expands or if the WTW working area is occupied for embankment construction for longer than anticipated. Additionally, approximately 10,250m of pipework is expected to be required for this option within the study area, further contributing to the programme risk. As with all options, the T2ST WTW relies on the completion of the SESRO reservoir for its operation.

5.3.7 While the prospective land parcel is expected to have sufficient space for construction and material storage, this option is situated in the north of the study area. This positioning leads to an increase in the overall quantity of materials required to be transported (i.e. increased pipe lengths) leading to increased vehicle movements. Additionally, the option's location results in an extended haulage and construction access distance across the study area, totalling approximately 6,400m.

5.3.8 The position of Option 1 demands approximately 10,250m of additional pipework to be laid, with all four pipes required to be laid side-by-side for extended lengths, adding to the overall complexity. Furthermore, a section of the potable and foul pipeline corridor is assumed to cross the main SESRO conveyance tunnel corridor. This presents potential additional complexities to the construction.

5.3.9 An additional pinch point introduced by the pipeline includes all four pipes crossing the potential ADC, sweetening flow pipework for the ADC as well as the EWD at three different points. The foul pipe also crosses the EWD at a separate point. These all contribute to the construction complexity of this option.

Engineering (Operability) Performance

5.3.10 Option 1 has no additional operability health and safety issues beyond the standard operation of a WTW. There are sufficient access and egress routes to the site, ensuring accessibility for routine operations and emergencies. While access for future repairs and upgrades may cause minor disruptions on the SESRO main access road and associated roads, these disruptions are considered manageable. This option is located approximately 8 km away from three major emergency services (Fire, hospital, and police) in Abingdon, therefore response time in case of an emergency is likely to be acceptable.

5.3.11 Gravity discharge for foul water and contingency flows is unlikely and low lift pumping is expected to be required. Additionally, the indicative land parcel for Option 1 has only 0.11km^2 for additional expansion and future modifications.

5.3.12 Maintenance requirements and complexity within the WTW are similar for all options, irrespective of the location. There is no differentiator between the options for water quality as all options will be receiving water from the same source. However, pipeline maintenance varies with length. Option 1 has 10,250m of total pipe and as such has a significant additional maintenance associated.

Cost and Carbon Performance

5.3.13 The major cost and carbon differentiator between the options will be the CAPEX cost and embodied carbon of the pipelines (to and from the site). Pipeline CAPEX cost for Option 1 is currently estimated at 5% of the Gate 2 CAPEX for the T2ST project.

5.3.14 Embedded carbon of the pipeline for this option is currently estimated at 4% of the Gate 2 CAPEX Carbon for the T2ST project. The location of Option 1 means that the reservoir embankments will provide partial concealment of the WTW and thus minimise earthworks and associated carbon for this purpose.

Environmental Performance

5.3.15 There are no proposed dust-generating activities that could not be managed using normal good practice and the potential effects during operation would lead to a negligible change in air quality.

5.3.16 The pipeline associated with this option requires a crossing with the EWD at two separate locations, posing a risk to WFD compliance. The current WFD and applicability assessment assume that new watercourses around the site will be excavated and then left to recover undisturbed. Therefore, the pipeline must be installed first to prevent disturbance. However, this could reduce habitat quality as the new EWD would need to be cut into cohesive fill over the pipeline, not in the existing ground profile. Adequate clearance between the channel bed and

pipe soffit is necessary for this to work. This option will also impact one small watercourse however this impact may be easily mitigated.

5.3.17 Construction of the WTW on this site will affect priority habitats such as hedgerow, woodland assumed to be lowland mixed deciduous woodland and arable field margins. Desk study, including analysis of Natural England's Ancient Woodland Inventory and historical maps indicates that no ancient woodland (considered to be irreplaceable habitat), would be affected.

5.3.18 Desk study of the Woodland Trust's Ancient Tree Inventory indicates that no ancient or veteran trees (also considered to be irreplaceable habitat) are located nearby; however, survey may potentially identify trees that could be classified as ancient or veteran trees.

5.3.19 The area of the site may be proposed for potential curlew habitat creation, as curlews' nest nearby, which could lead to disturbance impacts.

5.3.20 This option lies outside the flood zone (after SESRO is constructed), thereby minimizing the risk of flooding. It has been excluded from the RAG assessment as no differentiator has been identified between the options.

5.3.21 There are two concentrations of non-designated archaeological remains identified with a potentially high value and the potential for unknown buried archaeology. This could be mitigated but would be costly.

5.3.22 This option is likely to impact negatively on best and most versatile (BMV) land. Option 1 is in an area of potential land contamination as it is associated with a historic bombing range and infilled canal.

5.3.23 This option would erode local landscape character and is likely to be visible from local Public Rights of Way (ProW), while intervisibility with the North Wessex Downs National Landscape would be limited by the proposed reservoir embankment. The option would be isolated from communities and there would be little change to their visual amenity.

5.3.24 With best management practices and mitigation measures in place, it is anticipated that there will be no significant noise or pollution, during construction or operation.

Community, Planning and Land Performance

5.3.25 Option 1 performs well against the consenting criteria. This location would be within the expected area of SESRO construction works and likely Order Limits. Thus, it is unlikely that setting aside space for the WTW in this location would cause the SESRO project boundary to be extended or require additional land acquisition. It would, however, effect PRoW. It is within the area safeguarded for the reservoir (policies CP14 and CP14a) in the Vale of White Horse Local Plan 2031 and equivalent area in the consultation draft Joint Local Plan 2041

and does not conflict with local policy allocations or existing land uses.

5.3.26 As with all the options, it is not located within the specifically designated areas considered in the planning criteria, i.e., Green Belt, National Landscape, Common Land, Open Space or minerals safeguarding areas.

5.4 Option 2

5.4.1 This section summarises the performance of WTW Option 2 considering the appraisal themes and subthemes. For full details of the assessment of WTW Option 2 against individual criteria refer to Appendix B. The placement of Option 2 is shown in Figure 4.4 while the associated pipeline corridors are shown in Figure 4.5.

Engineering (Constructability) Performance

5.4.2 Option 2 construction activities which are noteworthy from a health and safety perspective and would increase the risk of endangering workers involved in the laying of pipelines: potable pipeline which will have interactions with the rail crossing and the foul pipeline which will have interactions with the A34 road. These would require enhanced control measures during construction.

5.4.3 With regards to third party impacts, the potential disruption to the existing road network associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movement required for the WTW, and pipeline construction is expected to moderately impact the A34 and Marcham Road.

5.4.4 Option 2 has moderate interdependencies with the main SESRO programme. Its proximity to the outer reservoir embankment, RWPS, tunnelling compound and various access roads introduce potential programme risks. The amount of pipework required within the study area, approximately 4,650m, is minimised due to the closeness of this option to the RWPS. As with all options, the T2ST WTW relies on the completion of the SESRO reservoir for its operation.

5.4.5 Limited space within the northeast corridor may hinder material storage and compound expansion. Whilst a moderate quantity of vehicle movements is expected, this is minimised due to the proximity of the works to the pumping station reducing the overall quantity of large diameter pipework. This option's placement requires a haulage and construction access distance across the Study area totalling approximately 4,000 meters.

5.4.6 The location of Option 2 clashes with the preferred SESRO main construction compound, albeit a potential alternative suitable location has been identified and would be further considered to confirm viability if this option is preferred. The construction compound for SESRO tunnelling and the SESRO pumping station, however, will still need to be located close to the WTW which may

introduce a clash if either compound requires expansion. The location of the WTW option near the pumping station reduces the overall length of pipework required to 4,650m, offering a reduction in construction complexity and challenges. All options require the potable pipeline to cross the railway on the south of the reservoir and the foul pipework under the A34.

5.4.7 A pinch point is introduced by the pipeline where the potable and foul pipes) cross the EWD and SESRO conveyance tunnel at different points. These contribute to the construction complexity of this option.

5.4.8 Option 2 is adjacent to the A415 – SESRO access road, which is expected to be very busy during the construction period, with heavy traffic from both the WTW and SESRO related activities, meaning additional safety precautions are likely to be required.

5.4.9 Option 2 has an overhead high voltage cable crossing the site, which will demand additional safety considerations. It is noted that diversion of overhead cables is being considered in the SESRO design and is subject to further design development.

Engineering (Operability) Performance

5.4.10 Option 2 has no additional operability health and safety issues beyond the standard operation of a WTW. There is sufficient access and egress routes to the site, ensuring accessibility for routine operations and emergencies. While access for future repairs and upgrades may cause minor disruptions on the SESRO main access road and associated roads, these disruptions are manageable. This option is located approximately 6km away from three major emergency services (Fire, hospital, and police) in Abingdon, therefore response time in case of an emergency is likely to be acceptable.

5.4.11 Gravity discharge for foul flow is not feasible and low lift pumping will be required. There is the potential to facilitate gravity transfer of contingency flows at this location. Additionally, there is no flexibility for future modifications or expansions as the indicative land parcel for Option 2 has less than 0.06 km^2 additional land.

5.4.12 Maintenance requirements and complexity within the WTW are similar for all options, irrespective of the location. There is no differentiator between the options for water quality as all options will be receiving water from the same source. However, pipeline maintenance varies with length. Option 2 has 4,650m of total pipe and as such has minimal additional maintenance associated.

Cost and Carbon Performance

5.4.13 The major cost and carbon differentiator between the options will be the cost and embodied carbon of the pipelines (to and from the site). Pipeline cost for

Option 2 is currently estimated at 2% of the Gate 2 CAPEX for the T2ST project.

5.4.14 Embedded carbon of the pipeline for this option is currently estimated at 1.8% of the Gate 2 CAPEX Carbon for the T2ST project. However, Option 2 is in an area with multiple activities and public access. This implies that there will be substantial earthworks and landscape activities to screen the WTW from public view.

Environmental Performance

5.4.15 There are no proposed dust-generating activities that could not be managed using normal good practice and the potential effects during operation would lead to a negligible change in air quality.

5.4.16 The pipeline associated with this option requires a crossing with the EWD at two separate locations, posing a risk to WFD compliance. The current WFD and applicability assessment assume that new watercourses around the site will be excavated and then left to recover undisturbed. Therefore, the pipeline must be installed first to prevent disturbance. However, this could reduce habitat quality as the new EWD would need to be cut into cohesive fill over the pipeline, not in the existing ground profile. Adequate clearance between the channel bed and pipe soffit is necessary for this to work. This option will also impact one small watercourse which would be lost under the footprint of the works however this impact may be mitigated against, from a Biodiversity Net Gain perspective, by constructing additional channel length elsewhere in the adjacent area.

5.4.17 Construction of the WTW on this site will affect priority habitats such as hedgerow, and broadleaved woodland. Desk study, including analysis of Natural England's Ancient Woodland Inventory and historical maps indicates that no ancient woodland (considered to be irreplaceable habitat), would be affected.

5.4.18 Desk study of the Woodland Trust's Ancient Tree Inventory indicates that no ancient or veteran trees (also considered to be irreplaceable habitat) are located nearby; however, survey may potentially identify trees that could be classified as ancient or veteran trees.

5.4.19 This option lies outside the flood zone, thereby minimizing the risk of flooding. It has been excluded from the RAG assessment as no differentiator has been identified between the options.

5.4.20 There is a concentration of high value remains identified within the option location with a high potential for unknown buried archaeology. This could be mitigated but would be costly.

5.4.21 This option is likely to impact negatively on best and most versatile (BMV) land. This location has not been previously used for contaminative purposes with the

nearest known potential contamination source being a farm 100m away.

5.4.22 This option would erode local landscape character and is likely to be visible from local PRoW and the north-western edge of Drayton. However, the intervisibility between Option 2 and the North Wessex Downs National Landscape would be limited by distance and the proposed reservoir embankment. Changes to visual amenity of the local community in Drayton could likely be mitigated with sensitive design, earthworks and planting.

5.4.23 With best practice management and mitigation measures in place, it is anticipated that there will be no significant noise or pollution during construction or operation.

Community, Planning and Land Performance

5.4.24 Option 2 performs well against the consenting criteria. This location would be within the expected area of SESRO construction works and likely Order Limits. Thus, it is unlikely that setting aside space for the WTW in this location would cause the SESRO project boundary to be extended or require additional land acquisition. It is within the area safeguarded for the reservoir (policies CP14 and CP14a) in the Vale of White Horse Local Plan 2031 and equivalent area in the consultation draft Joint Local Plan 2041 and does not conflict with local policy allocations or existing land uses.

5.4.25 As with all the options, it is not located within the specifically designated areas considered in the planning criteria, i.e., Green Belt, National Landscape, Common Land, Open Space, or minerals safeguarding areas.

5.4.26 However, the option is in full view of potential visitors to the reservoir and could be disruptive of people's enjoyment of the reservoir site.

5.5 Option 3

5.5.1 This section summarises the performance of WTW Option 3 considering the appraisal themes and subthemes. For full details of the assessment of WTW Option 3 against individual criteria refer to Appendix C. The placement of Option 3 is shown in Figure 4.6 while the associated pipeline corridors are shown in Figure 4.7.

Engineering (Constructability) Performance

5.5.2 Option 3 construction activities which are noteworthy from a health and safety perspective and would increase the risk of endangering workers regarding the tight working corridor and the railway border to the south. While working near an operating railway inherently increases risk, it is a necessary requirement for all available options to facilitate the potable pipe rail crossing. However, due to the fact this option borders the railway the quantity of enhanced safety

measures is increased.

5.5.3 With regards to third party impacts, the potential disruption to the existing road network associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movements required for the WTW, and pipeline construction is expected to moderately impact the A34 and Marcham Road, thus the amber scoring in the RAG assessment. Furthermore, the construction access road requires a crossing with the East Hanney road diversion.

5.5.4 Option 3 has major interdependencies with the main SESRO programme due to the significant length of pipework required, and the proximity to the railway. The length of pipework needed within the study area, approximately 11,800m, is exacerbated due to the location of the WTW on the southern edge of the study area, away from the RWPS and Abingdon STW, therefore increasing programme risk. Additionally, the proximity of this site to the railway may introduce a significant programmatic risk if rail operators raise issues during construction. As with all options, the T2ST WTW relies on the completion of the SESRO reservoir for its operation.

5.5.5 Limited space within the southern corridor may hinder material storage and compound expansion. This positioning leads to an increase in the overall required vehicle movements due to the larger diameter pipework. Additionally, the option's location results in an extended haulage and construction access distance across the Study area, totalling approximately 8,100m.

5.5.6 While no conflicts with planned SESRO assets have been identified within Option 3, its positioning necessitates approximately 11,800m of pipework, with raw, contingency and foul pipes required to be laid side-by-side for extended lengths, adding to the overall complexity. Furthermore, the proximity to the railway may result in limitations for plant activity, such as crane height issues. The tight working corridor also required a unique WTW layout to be developed, further increasing complexity due to the tighter working compound. All options require the potable pipeline to cross the railway on the south of the reservoir and the foul pipework under the A34.

5.5.7 A pinch point is introduced by the pipeline where the raw, contingency, and foul pipes cross the EWD at one point. The foul pipe also crosses the EWD and the SESRO conveyance tunnel at a separate point. These all contribute to the construction complexity of this option.

5.5.8 Option 3 has an overhead high voltage cable crossing the site, which will demand additional safety considerations. It is noted that diversion of overhead cables is being considered in the SESRO design and is subject to further design development.

Engineering (Operability) Performance

5.5.9 Option 3 has no additional operability health and safety issues beyond the standard operation of a WTW. However, access and egress routes to the site for routine operations and emergencies would necessitate using the East Hanney Road Diversion, presenting potential challenges and restrictions as traffic passes through Steventon or East Hanney. This access issue is exacerbated when accommodating construction access for future repairs and upgrades. This option is located approximately 10km away from three major emergency services (Fire, hospital, and police) in Abingdon, therefore response time in case of an emergency is likely to be acceptable.

5.5.10 Gravity discharge for foul flows is not feasible, and low lift pumps will be required. There is the potential to facilitate gravity transfer of contingency flows at this location. Additionally, there are limitations in terms of flexibility for future modifications. Additionally, the indicative land parcel for Option 3 has only 0.06km^2 for additional expansion and future modifications.

5.5.11 Maintenance requirements and complexity within the WTW are similar for all options, irrespective of the location. There is no differentiator between the options for water quality as all options will be receiving water from the same source. However, pipeline maintenance varies with length. Option 3 has 11,800m of total pipe and as such has significant additional maintenance requirement.

Cost and Carbon Performance

5.5.12 The major cost and carbon differentiator between the options will be the cost and embodied carbon of the pipelines (to and from the site). The pipeline cost for Option 3 is currently estimated at 5% of the Gate 2 CAPEX for the T2ST project.

5.5.13 Embedded carbon of the pipeline for this option is currently estimated at 3% of the Gate 2 CAPEX Carbon for the T2ST project. The location of Option 3 means that the embankments of the reservoir will provide partial screening of the WTW, however substantial earthworks (with associated carbon) will still be required to screen the site from public view.

Environmental Performance

5.5.14 There are no proposed dust-generating activities that could not be managed using normal good practice and the potential effects during operation would lead to a negligible change in air quality.

5.5.15 The pipeline associated with this option requires a crossing with the EWD at two separate locations, posing a risk to WFD compliance. The current WFD and applicability assessment assume that new watercourses around the site will be

excavated and then left to recover undisturbed. Therefore, the pipeline must be installed first to prevent disturbance. However, this could reduce habitat quality as the new EWD would need to be cut into cohesive fill over the pipeline, not in the existing ground profile. Adequate clearance between the channel bed and pipe soffit is necessary for this to work. This option will also impact one small watercourse however this impact may be easily mitigated.

5.5.16 Construction of WTW on this site may affect priority habitats such as hedgerow, woodland assumed to be lowland mixed deciduous woodland, ponds and arable field margins. Also, the site is located close to the Cuttings and Hutchins Copse Local Wildlife Site (LWS) which could suffer disturbance to associated protected and notable species. Desk study, including analysis of Natural England's Ancient Woodland Inventory and historical maps indicates that no ancient woodland (considered to be irreplaceable habitat), would be affected.

5.5.17 Desk study of the Woodland Trust's Ancient Tree Inventory indicates that no ancient or veteran trees (also considered to be irreplaceable habitat) are located nearby; however, survey may potentially identify trees that could be classified as ancient or veteran trees.

5.5.18 This option lies outside the flood zone, thereby minimizing the risk of flooding. It has been excluded from the RAG assessment as no differentiator has been identified between the options.

5.5.19 This option overlaps with concentrations of high value archaeology. Any potential impacts can be mitigated, but this would be costly.

5.5.20 Option 3 is located on the site of the Steventon Depot which is considered to have high potential for contamination.

5.5.21 This option would erode local landscape character particularly woodland along the Great Western Main Line railway. It is the closest to the North Wessex Downs National Landscape and would, therefore, be the most visible from the designation, including in views from the Ridgeway National Trail, although the WTW would potentially be seen against the backdrop of the proposed reservoir embankment.

5.5.22 With best practice management and mitigation measures in place, it is anticipated that there will be no significant noise or pollution during construction or operation.

Community, Planning and Land Performance

5.5.23 Option 3 performs well against most of the consenting criteria but is slightly less favourable than Options 1 and 2. It may require slightly extending the SESRO Order Limits (compared to the likely extent for construction works and operation without the WTW) particularly if located south of the realigned East Hanney to Steventon Road, which is likely to be adopted by the highway

authority after construction. It would require construction and operation in close proximity to Network Rail's assets and land ownership.

5.5.24 Option 3 is within the area safeguarded for the reservoir (policies CP14 and CP14a) in the Vale of White Horse Local Plan 2031 and equivalent area in the consultation draft Joint Local Plan 2041 and does not conflict with local policy allocations or existing land uses. As with all the options, it is not located within the specifically designated areas considered in the planning criteria, i.e., Green Belt, National Landscape, Common Land, Open Space or minerals safeguarding areas.

5.6 Option 4

5.6.1 This section summarises the performance of WTW Option 4 considering the appraisal themes and subthemes. For full details of the assessment of WTW Option 4 against individual criteria refer to Appendix D. The placement of Option 4 is shown in Figure 4.8 white the associated pipeline corridors are shown in Figure 4.9.

Engineering (Constructability) Performance

5.6.2 Option 4 construction activities which are noteworthy from a health and safety perspective and would increase the risk of endangering workers involved in the laying of pipelines: potable pipeline which will have interactions with the rail crossing and the foul pipeline which will have interactions with the A34 road. These would require enhanced control measures during construction.

5.6.3 With regards to third party impacts, the potential disruption to the existing road network associated with SESRO construction heightens the sensitivity to additional vehicle movements. Therefore, the extra vehicle movements required for the WTW, and pipeline construction is expected to moderately impact the A34 and Marcham Road.

5.6.4 Option 4, despite being situated away from other SESRO construction activities still has dependencies with the main SESRO programme. Approximately 7,700m of pipework is required for this option within the study area, with raw, contingency and potable pipes required to be laid side-by-side for significant lengths, further contributing to the programme risk. However, overall pipework length is partially minimised due the reduced length of foul pipework due to proximity to the STW. As with all options, the T2ST WTW relies on the completion of the SESRO reservoir for its operation.

5.6.5 This option has adequate space for construction and material storage. Whilst a moderate quantity of vehicle movements is expected, this is minimised due to the moderate proximity of the works to the pumping station partially reducing the overall quantity of large diameter pipework. The option's placement requires a haulage and construction access distance across the Study area totalling

approximately 2,900m.

5.6.6 This option has no conflict with planned SESRO assets identified within the WTW site and associated compound. However, the positioning of the WTW option requires the raw, contingency and potable pipeline corridor to cross the alignment of the main SESRO conveyance tunnel corridor.

5.6.7 Pinch points are introduced where the raw, contingency, and potable pipes cross the EWD and SESRO conveyance tunnel at two different points, with the potable pipe having an additional crossing with the EWD. These all contribute to the construction complexity of this option.

5.6.8 Option 4 is adjacent to the A415 – SESRO access road, which is expected to be very busy during the construction period, with heavy traffic from both the WTW and SESRO related activities, meaning additional safety precautions would be required to be taken.

Engineering (Operability) Performance

5.6.9 Option 4 has no additional operability health and safety issues beyond the standard operation of a WTW. There are sufficient access and egress routes to the site, ensuring accessibility for routine operations and emergencies. While access for future repairs and upgrades may cause minor disruptions on the SESRO main access road and associated roads, these disruptions are manageable. This option is located approximately 5 km away from three major emergency services (Fire, hospital, and police) in Abingdon, therefore response time in case of an emergency is likely to be acceptable.

5.6.10 Gravity discharge for foul water and contingency flows is not feasible and low lift pumping will be required. Additionally, the indicative land parcel for Option 4 has ample space (0.21 km^2) for additional expansion and future modifications.

5.6.11 Maintenance requirements and complexity within the WTW are similar for all options, irrespective of the location. There is no differentiator between the options for water quality as all options will be receiving water from the same source. However, pipeline maintenance varies with length. Option 4 has 7,700m of total pipe and as such has additional maintenance requirements.

Cost and Carbon Performance

5.6.12 The major cost and carbon differentiator between the options will be the cost and embodied carbon of the pipelines (to and from the site). Pipeline cost for Option 4 is currently estimated at 4% of the Gate 2 CAPEX for the T2ST project.

5.6.13 The embedded carbon of the pipeline for this option is currently estimated at 3% of the Gate 2 CAPEX Carbon for the T2ST project. The location of Option 4 is in an exposed location and will require significant landscape manipulations

and earthworks and associated carbon to screen the WTW from view of the public.

Environmental Performance

5.6.14 There are no proposed dust-generating activities that could not be managed using normal good practice and the potential effects during operation would lead to a negligible change in air quality.

5.6.15 The pipeline associated with this option requires a crossing with the EWD at two separate locations, posing a risk to WFD compliance. The current WFD and applicability assessment assume that new watercourses around the site will be excavated and then left to recover undisturbed. Therefore, the pipeline must be installed first to prevent disturbance. However, this could reduce habitat quality as the new EWD would need to be cut into cohesive fill over the pipeline, not in the existing ground profile. Adequate clearance between the channel bed and pipe soffit is necessary for this to work.

5.6.16 Construction of the WTW on this site will affect priority habitats such as hedgerow and woodland assumed to be lowland mixed deciduous woodland. Desk study, including analysis of Natural England's Ancient Woodland Inventory and historical maps indicates that no ancient woodland (considered to be irreplaceable habitat), would be affected.

5.6.17 Desk study of the Woodland Trust's Ancient Tree Inventory indicates that no ancient or veteran trees (also considered to be irreplaceable habitat) are located nearby; however, survey may potentially identify trees that could be classified as ancient or veteran trees.

5.6.18 This option lies outside the flood zone, thereby minimizing the risk of flooding. It has been excluded from the RAG assessment as no differentiator has been identified between the options.

5.6.19 There are no direct or indirect impacts to heritage designations. Also, there are no known archaeological remains identified but further archaeological investigation may be required to inform mitigation. Any potential impacts to buried archaeological remains may be mitigated.

5.6.20 This option is located on best and most versatile agricultural soil. There is a potential source of contamination from the redundant canal.

5.6.21 This option would erode the local landscape character and be visible from local PRoW and in open views from properties on the north-western edge of Drayton. There would be distant views from North Wessex Downs National Landscape and The Ridgeway National Trail. However, changes to visual amenity of the local community in Drayton could likely be mitigated with sensitive design, earthworks and planting.

5.6.22 With best practice management and mitigation measures in place, it is anticipated that there will be no significant noise or pollution during construction or operation.

Community, Planning and Land Performance

5.6.23 Option 4 performs well against most of the consenting criteria but is the least favourable option in land terms. Some of the Option 4 land is needed to construct the main access road and a section of the EWD for SESRO. However, the site is close to the indicative SESRO boundary, in an area with minimal permanent SESRO infrastructure. Whilst it is currently assumed that all land within the boundary needed just for construction activities (and not for SESRO works) will be retained permanently due to the longevity of the construction period, there is a possibility that this land would have to be handed back to the original land owner (assuming no severance or business extinguishment issues arise) upon completion of SESRO works. Further work is required to confirm the Order Limits for the DCO application and, as part of that work, this issue will be kept under review to establish the land implications should this option be preferred.

5.6.24 PRoWs from Drayton are severed and the position of the option is in full view of potential visitors to the reservoir and could be disruptive to people's enjoyment of the new reservoir.

5.6.25 Option 4 is within the area safeguarded for the reservoir (policies CP14 and CP14a) in the Vale of White Horse Local Plan 2031 and equivalent area in the consultation draft Joint Local Plan 2041 and does not conflict with local policy allocations or existing land uses. However, it is located on land safeguarded for the South Abingdon Movement Corridor (Policy IN3) of the South Oxfordshire and Vale of White Horse consultation draft Joint Local Plan 2041 (and partially within the equivalent safeguarded area in the existing Local Plan 2031) and could possibly conflict with future delivery of any proposals within that corridor.

5.6.26 As with all the options, it is not located within the specifically designated areas considered in the planning criteria, i.e., Green Belt, National Landscape, Common Land, Open Space, or minerals safeguarding areas.

6 Preferred Options

This section compares by subtheme the options' assessment performances for the T2ST WTW and provides the reasoning for the preferred options; therefore, this section is a summary of appraisal step 6 (workshop to agree preferred options) for the T2ST WTW.

6.1 Comparison of Engineering Performances

For the constructability and operability themes, the two tables below (Table 6.1 and Source: Thames Water Internal, 2024

6.1.1 Table 6.2) present a comparison of options for the T2ST WTW by subtheme, after their assessment against the appraisal criteria (reported in Section 2) and workshop discussion.

Table 6.1: Constructability Subtheme Narratives

Subtheme	Narrative
Health and Safety	All options necessitate working in close proximity to an operating railway to facilitate the potable pipe rail crossing. Also, all options require the foul pipeline to cross the A34 road. Options 2 and 4 are both adjacent to the A415 to SESRO access road, which would have heavy traffic during the construction, both from the WTW and SESRO related construction activities, meaning additional safety precautions would be required. In addition, Option 2 is situated within a congested area of the study area, near the main SESRO tunnelling and pumping station operations, and thus it would demand safety measures. Option 3 requires safety precautions due to its proximity to the active railway and the proposed Steventon – East Hanney diversion road which would be fully operational at the time of construction. Options 2 and 3 have overhead high voltage cables crossing the site, albeit these are being considered in the SESRO design and are subject to further design development.
Third Party Impact	All options present a moderate impact on the existing road network due to the heightened sensitivity to additional vehicle movements. While all other options have scored equally, Option 3 is least preferred due to the requirement of an additional crossing point on the proposed East Hanney Road Diversion which would likely be managed by traffic lights. Option 2 is favourable due to reductions in overall pipework length, thus reducing anticipated vehicle movements. On the other hand, third parties may impact the WTW depending on the location of the option. The prospective reserved corridor for the Wilts and Berks Canal crosses through Option 1. Options 2, 3 and 4

Subtheme	Narrative
	have high voltage electric cables (either overhead, underground or both) and may be impacted upon by the Distribution Network Operator (DNO). Option 3 has additional potential impacts from the railway network. Option 4 may potentially require interaction with a trunk main, but the area has ample space to avoid this.
Programme	All options carry a notable programme risk as the T2ST WTW necessitates the completion of the SESRO reservoir for its operation and commissioning. Therefore, any programme risk associated with SESRO is carried forward into the T2ST programme risk. Option 3 scores poorly due to increased risk, predominantly associated with the proximity to the railway and being adjacent to a fully operational road (Steventon – East Hanney diversion road). Option 2 also scores poorly due to additional programmatic risk from the constricted and busy nature of the north-east corridor and the various other elements of SESRO that are to be constructed around the vicinity. Option 4 emerges the most favourable, as it is located away from other SESRO construction activities.
Logistics	Option 4 scores favourably due to its ample potential space for construction and material storage, coupled with the lowest required haulage distance. The other options are acceptable from a logistical standpoint, although they exhibit a combination of increased vehicle movement, extended haulage distances, and space limitations. Notably, a significant portion of the access road infrastructure for all options is not entirely new to the WTW, as it will also serve the construction needs of SESRO.
Construction Complexity	All the options have construction complexities, mostly introduced by the laying of the pipework. For instance, all options require the potable pipeline to cross the railway on the south side of the reservoir, and foul pipework under the A34. In addition, all options require a section of pipeline corridor to cross the main SESRO conveyance tunnel corridor. Options 1 and 3 necessitate that all four pipelines be laid side-by-side for extended lengths, increasing complexity. Option 2 conflicts with the preferred SESRO construction compound. Option 3 presents additional complexity due to the constrained nature of the site and its close proximity to the railway and road. In general, Option 2 emerges as the least favourable option, as it would potentially cause clashes with other SESRO activities in its vicinity (e.g., RWPS construction). However, it should also be noted that Option 2 has the shortest total pipework length at approximately 4,650m, resulting in lowest vehicle movements, programme duration and pipeline construction complexity. Options 1 and 4 emerge as the most favourable due to no conflicts with planned SESRO assets.

Source: Thames Water Internal, 2024

Table 6.2: Operability Sub-Theme Narratives

Sub-Theme	Narrative
Health and Safety	No health and safety issues beyond the standard operation of a WTW have been identified for any of the options. Option 1, 2 & 4 have sufficient access and egress routes, ensuring accessibility for routine operations and emergencies, however, Option 3 necessitates using the East Hanney Road Diversion, increasing traffic load on East Hanney and Steventon. Furthermore, Option 3 ranks least favourably due to the requirement for the narrow working corridor and adjacent live rail and road hazards.
Operational Complexity	At this stage maintenance requirements and complexity for the WTW are assumed to be the same for all options. However, additional complexities are introduced with longer pipe lengths.
Operational Resilience	Option 4 stands out favourably due to its flexibility for future modifications. While the opportunity for future modifications is challenging within indicative locations for Options 1 and 3, it is deemed unsuitable within the indicative location for Option 2. All options will likely necessitate some degree of pumping, but the installation of backup pumps will help mitigate against single failure sources. Option 3 is at a slightly elevated location which may avoid the requirement to pump contingency / overflow flows.
Water Quality	Although there may be minor variations in water quality based on the raw or potable pipeline lengths, at this stage it is assumed there is no differentiator between the options for water quality, as all options will be receiving water from the same source (i.e. the reservoir).

Source: Thames Water Internal, 2024

6.1.2 Overall, Option 3 is the most unfavourable due to envisaged programme risk and likely safety precautions associated with working near a live railway and road. It also contains a marginally greater third-party impact during construction as the option necessitates an additional crossing point on the proposed East Hanney Road Diversion which would likely be managed by traffic lights. On the other hand, Option 4 provides ample space for future expansion and construction, away from other SESRO construction activities. Option 2, while not offering this expansion opportunity, has the shortest total pipework length at approximately 4,650m, resulting in lowest vehicle movements, programme duration and pipeline construction complexity. Option 4 follows, requiring an approximate total of 7,700m of pipework. Options 1 and 3 score least favourably in this aspect, necessitating approximately 10,250m and 11,800m of pipework, respectively.

6.1.3 The WTW construction complexity associated with Option 2, warrants further consideration as it is situated within a congested area of the study area, near the main SESRO tunnelling operations. The preferred location for the SESRO

main construction compound currently aligns with Option 2. This placement positions the main SESRO construction compound at a central point, conveniently situated near the main access road and in close proximity to the tunnelling compound. While an alternative main construction compound has been identified, a 150m x 150m tunnelling compound in this area is likely to be required to facilitate the tunnelling works. If the ADC is not progressed, there will be sufficient space to accommodate both the WTW and the associated construction compound alongside the tunnelling construction compound. However, if the ADC is constructed, the construction of a WTW at this location may prove higher risk.

6.1.4 Based on the above, Option 4 is considered preferable in the overall engineering assessment.

6.2 Comparison of Cost and Carbon Performances

6.2.1 For the cost and carbon theme, Table 6.3 below presents a comparison of options for the T2ST WTW by subtheme, after their assessment against the appraisal criteria (reported in Section 5 above) and workshop discussion.

Table 6.3: Cost and Carbon Subtheme Narratives

Sub-Theme	Narrative
Cost	The major cost differentiator between the options is the CAPEX of the pipelines to and from the site. The pipeline cost as a percentage of the Gate 2 CAPEX for the T2ST project are 5%, 2%, 5% and 4% respectively for Options 1 to 4. At this stage there is no difference between these options regarding the opportunity for cost-sharing with other SROs. Option 2 at face value appears to be the most economic, however, this does not account for optimism bias or risk.
Carbon	The major differentiator between the options is the embodied carbon emissions associated with the pipelines to and from the site. The embodied carbon emissions of the combined pipelines for the individual options, as a percentage of the Gate 2 CAPEX Carbon for the T2ST project are estimated at 4%, 1.8%, 3% and 3% for Options 1 to 4 respectively.

Source: Thames Water Internal, 2024

6.2.2 Options 1 and 3 have the largest estimated pipeline CAPEX and Option 2 has the lowest. Option 2 scores favourably with the lowest estimated pipeline embodied carbon, with Option 1 scoring the worst.

6.2.3 Based on the above, Options 2 is the most favourable with Options 1 and 3 the least favourable.

6.3 Comparison of Environmental Performances

6.3.1 For the environmental performance theme, the table below (Table 6.4) presents a comparison of the options for the T2ST WTW by subtheme, after their assessment against the appraisal criteria (reported in Section 2) and workshop discussion. The subtheme narratives in the table consider options during both construction and operation.

Table 6.4: Environmental Subtheme Narratives

Subtheme	Narrative
Air Quality	No significant impacts to air quality are expected. All activities are readily controllable by standard practice. Air quality is not a material differentiator between the options.
Aquatic Environment	Both Options 1 and 3 will impact a small watercourse, but these impacts may be easily mitigated. As such, the impacts to the aquatic environment due to the location of the WTW are expected to be similar for all options so there is no material differentiator between the options. However, the pipeline routes associated with all options necessities a crossing with the EWD at two separate locations, posing a risk to WFD compliance. The approach employed thus far within the WFD assessment and accompanying Applicability Assessment is that new watercourses around the site would be excavated and then left to recover without further interference. As a result, the pipelines would need to be installed prior to avoid disturbance. However, there is a potential for reduced habitat quality as the new EWD would largely need to be cut into fill over the pipeline (using a cohesive material), and not in the existing ground profile as had been planned. There would need to be sufficient headroom between the bed of the channel and the soffit level of the pipe for this to work.
Biodiversity and Nature Conservation	Option 3 is the least preferred option as it is located adjacent to the Cuttings and Hutchins Copse LWS. All options could potentially affect ancient or veteran trees if present and all options affect priority habitats. Options 1, 2 and 4 result in similar effects but Option 1 has the potential to impact potential curlew habitat.
Biodiversity and Nature Conservation and Landscape	Option 3 is the least preferred option as there is likely to be a significant loss of existing vegetation including high quality trees. Options 2 is preferred as the majority of vegetation affected comprises arable fields.
Flood Risk	There is no differentiation between the sites in terms of flood risk. All options lie outside the flood zones (after construction of SESRO), thereby minimising the risk of flooding.

Subtheme	Narrative
Historic Environment	Options 4 is the preferred option as there are no effects on known archaeological remains, although further archaeological investigation would be required to inform mitigation. Options 1, 2 and 3 are not preferred as concentrations of high value archaeological remains are known to be present and mitigation is likely to be costly.
Land Quality	Option 2 is the preferred option as although it negatively impacts upon BMV agricultural soil, it is not located in an area of likely potential contamination. Options 1, 3 and 4 are not preferred due to being located in areas of known potential contamination with Option 3 being least preferred as it is sited on the Steventon Depot.
Landscape and Visual	All options have some impact on the local landscape character and sensitive visual receptors. Option 3 is least preferred as it is the closest to, and most visible from North Wessex Downs National Landscape and the Ridgeway National Trail. Option 1 is likely to be the least visible option from the National Landscape and National Trail, but mitigation opportunities may be limited due to the potential need for open habitat creation. Both Options 2 and 4 are likely to be visible from local PRoWs and in open views from properties on the north-western edge of Drayton. However, the intervisibility between Option 2 and the North Wessex Downs National Landscape would be limited by the proposed reservoir embankment, compared with Option 4 and the local changes to visual amenity could likely be mitigated long-term with sensitive design, earthworks and planting. As such, on balance, Option 2 is preferred. The pipelines would be buried so, on the whole, only construction effects are relevant to the consideration of landscape and visual effects. With the exception of vegetation loss that cannot be replaced due to easements these effects would be temporary and therefore the location of the pipelines is not a determining matter for the location of the WTW in landscape terms.
Noise	Not a material differentiator. No significant noise impacts expected for any option assuming best practice mitigation.
Pollution	No significant effects have been identified, as construction and operational emissions can be controlled using best practice techniques. Therefore, this is not a differentiating factor

Source: Thames Water Internal, 2024

6.3.2 Option 3 emerges as the least preferred choice due to its visibility from the North Wessex Downs National Landscape and the Ridgeway National Trail. Additional drawbacks associated with Option 3 include the proximity to The Cuttings and Hutchins Copse LWS. There is little to differentiate the other

options even though environmental scoring varies significantly across subthemes, but it is important to recognise that all options exhibit comparatively negative and positive environmental characteristics, some of which, including land contamination and heritage, would require further investigation by survey. Nevertheless Option 2 is preferred primarily on the basis of landscape and land quality.

6.4 Comparison of Community, Planning and Land Performances

6.4.1 For the community, planning and land theme, the table below presents a comparison of the options for the T2ST WTW by subtheme, after their assessment against the appraisal criteria (reported in Section 2) and workshop discussion.

Table 6.5: Community, Planning and Land Subtheme Narratives

Subtheme	Narrative
Socio-Economic	Options 1 and 3 are the preferred options as they are located the furthest from all reservoir recreational and operational visitor sites. Option 2 is located within close proximity to reservoir operational visitor buildings and proposed recreational facilities as shown at the time of this study. Option 4 would be the first building people see when entering the site, potentially affecting people's enjoyment of the site.
Consenting	Options 1 and 2 are preferred as they would be within the expected area of SESRO Works and Order Limits notwithstanding the WTW, remain within the area safeguarded for SESRO, and do not conflict with local policy allocations or existing land uses. Option 3 could require a slightly greater Order Limits extent and construction of the WTW in close proximity to Network Rail assets. Option 4 may (or may not, as a result of severance or business extinguishment) lie outside land that would otherwise have been required for SESRO and lies within the area proposed to be safeguarded for the South Abingdon Movement Corridor (Policy IN3) of the South Oxfordshire and Vale of White Horse consultation draft Joint Local Plan 2041.
Transport Planning	During normal operation of the WTW, Options 1, 2 and 4 present minimal impact on the existing road network and are therefore preferred. Option 3 would necessitate using the Hanney Steventon Road Diversion, which entails passing through one of the respective villages. This impact is potentially heightened when facilitating future repairs and upgrades, making Option 3 the least preferred.
Property and Land Acquisition	Option 2 is preferred for two primary reasons. Firstly, the land is likely to be acquired for the project anyway. Secondly, the location would give rise to few Part 1 (of the Land Compensation Act 1973) claims because of its location. Option 4 emerges as the least favourable as it may require additional land purchase.

Source: Thames Water Internal, 2024

6.4.2 Overall, for community, planning and land Options 1 and 2 score favourably for three of the four sub-themes and are therefore the preferred options from a community, planning and land viewpoint.

6.5 Confirmation of Preferred Options

6.5.1 The outcome from the assessment and workshop for the T2ST WTW is that Options 2 and 4 are the most favourable.

6.5.2 Option 2 performs slightly stronger overall than the other options in areas, such as:

- Cost and Carbon – Option 2 performs best as it requires the shortest length of pipework due to it being situated closest to the RWPS.
- Environmental – Option 2 is preferred on landscape grounds, nor is it situated in a potential contamination zone.
- Consenting – Option 2 is ranked first alongside Option 1 as both options are within the expected area of SESRO works.

6.5.3 However, as discussed in Section 6.1.3, the construction complexity risk associated with Option 2 is higher, particularly if the ADC is constructed.

6.5.4 Option 4 is also favourable and may become even more so should the ADC progress. Option 4 scores strongly in a few areas, including:

- Constructability – Option 4 performs strongest, being located away from the majority of other SESRO construction activities and has the largest available space.
- Cost and Carbon – Option 4 is second, due to reductions in pipeline length due to moderate proximity to the RWPS, alongside the shortest length of foul pipe required.

7 Conclusions and Next Steps

This section provides conclusions from this WTW site selection report and provides recommendations for future work.

7.1 Conclusions

7.1.1 The purpose of this appraisal study is to identify favourable site(s) for the T2ST WTW within the SESRO site.

7.1.2 For the assessment of the WTW options, two specific criteria were developed which related to construction complexity of the pipeline and WTW Reliability in terms of resilience to interruption to supply.

7.1.3 Following the desktop-based RAG assessments, a workshop was held to bring together specialists to discuss the assessment against the criteria and consider the alternatives so that favourable option(s) were identified.

7.1.4 The outcome of the appraisal study is that Options 2 and 4 are the most favourable. Details of these two options can be found in Sections 0 and 4.5 respectively.

7.2 Next Steps

7.2.1 The following activities are required to finalise option selection and take forward the SESRO design The following activities are required to progress option selection and develop the SESRO design:

- The preferred options will be included in the SESRO Gate 3 Interim Landscape and Environmental Master Plan for summer 2024 consultation.
- To facilitate selection of a single preferred option for DCO an Option 2 buildability review will be undertaken. This will further consider the compounds required for construction of SESRO to confirm the feasibility of Option 2, as covered in Section 6.1.3.
- Option 4 is located adjacent to the indicative boundary of SESRO, which could change in further iterations of the design and Master Plan before the Order Limits are set for DCO. Specific back-checking of boundary changes will be undertaken in relation to Option 4 as the design develops.
- Validate the desktop studies underpinning assessments made for this appraisal with field surveys and stakeholder engagement, where required.
- Backcheck the appraisal to consider any changes and/or additional information, including consideration of feedback from the first non-statutory consultation in Summer 2024. Section 1.2 contains further detail on backchecking.

- Develop and undertake a scope of work for further design development and integration between T2ST and SESRO (based on the proposals below).

The proposed next steps for design development include:

Design Development Next Step	Timeline	Ownership
Define and agree shared assets between SESRO and T2ST: Including design responsibilities, capacities, ownership, and costs for raw water pumping station (RWPS) and foul sewer.	Pre Q3 2024	SESRO T2ST
SESRO Tunnel sweetening flows: Consideration of T2ST flows in further development of the SESRO Conveyance Tunnel sweetening flow design to determine if the operation of the T2ST WTW can facilitate sweetening flows within the Tunnel.	Pre Q3 2024	SESRO
Utilities: Consultation with Thames Water's wastewater operations to agree discharges to Abingdon STW and likely licensing requirements for both T2ST and SESRO. Identify if a drainage impact assessment is required. Agree power supply and application approach, including design, backup and capacity requirements.	Pre Q3 2024	SESRO T2ST
Optimism bias and risk assessment: Develop combined Quantitative Cost Risk Analysis (QCRA) to account for the T2ST assets within the SESRO site.	Pre Q1 2025	SESRO T2ST
Review Drinking Water Quality Risk Assessment (DWQRA): Understand if site selection influences outputs.	Pre Q1 2025	SESRO T2ST
Raw water flows from the RWPS to WTW: Develop an outline design and operating philosophy for flows from the reservoir / RWPS to the WTW and return commissioning and operational flows from the WTW to the RWPS.	Pre Q1 2025	SESRO T2ST
Sustainable drainage systems (SuDS): Develop an outline design and operating philosophy for surface water discharges within the WTW site, so that if appropriate	Pre Q1 2025	T2ST

Design Development Next Step	Timeline	Ownership
these can be incorporated within the wider SESRO site drainage proposals.		
Pipeline crossing method and sequencing: Agree outline construction method and sequencing for crossing A34, railway and watercourse diversions. Pipeline alignment and bedding to be designed to avoid impacting the diverted watercourses.	Pre Q1 2025	SESRO T2ST
T2ST design development: to include development of site-specific layouts including landscaping, site security and contingency discharges and outline pipeline commissioning plan.	Pre Q1 2025	T2ST

Source: Thames Water Internal, 2024

A. WTW Placement Option 1 Criteria Workbook

Option 1

Option Description

Water Treatment Works - Option 1

Criteria code	Criteria Description	Method of Assessment	RAG	Description of RAG	Narrative	Sub-Theme
Constructability						
CON1	Safety - Risk of endangering construction workers or members of the public during construction e.g. water, ground, height, rail, road and utilities	Look at programme and list types of construction involved. Identify any that could potentially score red or amber. Sub-list of activities which would make it amber i.e. Tunnelling = Amber	A	Works can be constructed safely but enhanced control measures required	Important construction activities associated with the SESRO construction program need to be taken into account during the installation of the WTW and associated pipelines. Noteworthy considerations related to Option 1 with regards to laying of the associated pipework include the following: • Potable pipeline crossing with the Railway • Foul pipeline crossing A34. • all four pipes crossing the ADC, sweetening flow pipework for the ADC as well as the EWD at three different points • The foul pipe also crosses the EWD at a separate point All these will require enhanced safety control measures. Further enhanced control measures are needed to account for the substantial nearby earthworks associated with the SESRO construction, albeit these should be managed by the SESRO contractor.	Health and Safety
CON2A	Programme - Duration, longest /shortest, but also consider whether the longer duration has an impact on the overall scheme programme	Compare differences in the programmes which would materialise from different options. Consider earthworks seasons.	A	Likely to extend the duration of the relevant area of works (e.g. road, rail siding or intake/offtake construction) compared to the Gate 2 SESRO programme but unlikely to impact on the critical path of the Gate 2 SESRO programme.	The T2ST program timescale may be influenced by several key factors, including pipework length and number of pipes to be laid side-by-side, material transport, and other SESRO compound activities. Due to the location of Option 1, which lies north of the reservoir, there is a need for longer pipelines (especially the 1,000mm diameter potable pipe and the 1,100mm raw and contingency pipes). Additionally, the overall pipework length (encompassing foul, potable, raw, and contingency connections) is greater for this option. Option 1 is situated away from the raw water pumping station (RWPS) (for raw and contingency connections), the southern SESRO border (for potable connection), and the eastern SESRO border (for foul connection). It is important to acknowledge that the programme impact assessment has been conducted based on the T2ST programme and risks of extension for this SRO. The installation of the T2ST WTW is not anticipated to affect the SESRO programme. The associated pipeline installations are likely to occur early in the SESRO programme, and they will be integrated in a manner that minimizes disruption and does not extend the SESRO programme duration. However, it is essential to note that an overall T2ST programme has not yet been finalized, and therefore, the full interactions with the T2ST programme have not been thoroughly assessed.	Programme
CON2C	Programme - Dependencies i.e. proximity or physical relationships between elements of scope that introduce programme dependencies	Is the options on the critical path? Will it impact other critical activities?	A	Several major dependencies/ multiple minor dependencies	Construction of the T2ST WTW alongside the SESRO reservoir introduces dependencies for all options. If the contractor for SESRO and T2ST (within the SESRO boundary) is the same, the risk associated with program disruption and dependencies is greatly reduced. T2ST construction is due to start in 2034, to be brought into service by 2040. SESRO construction is due to start in 2024, to be brought into service by 2040. The T2ST WTW pipeline corridors follow the access road around the reservoir, introducing a program dependency. Construction of the T2ST WTW is dependent on the completion of various access roads and construction compounds. The T2ST WTW is also dependent on the completion of the SESRO reservoir to enable operation of the works.	Programme
CON2D	Programme - Risk	Are there items in the construction which have a significant programme risk	A	Moderate programme risk	The risk associated with Option 1 is partially exacerbated due to the second greatest overall length of pipework required, and the greatest length of large diameter pipework (potable/raw/contingency). Option 1, however, has the benefit of being located away from north east corridor and doesn't have a restricted working compound. Site A is in close proximity to the outer embankment toe, which increases programme complexity.	Programme
CON3A	Logistics - Space available for construction and materials storage	Determine space constraints using GIS and options layouts from option definition.	G	Adequate space	Option 1 offers adequate space for construction, materials, and storage. While the site's proximity to the reservoir's outer embankment and canal does impose some constraints, these limitations remain manageable. Should a WTW be established in this area, it might necessitate the realignment of the canal, which could, in turn, affect the planned SESRO flood compensation strategy.	Logistics
CON3B	Logistics - Suitable and efficient access for construction workers, deliveries and waste removal including minimisation of lengths of new roads for access during construction	Determine method of access using GIS and options layouts from option definition.	A	Due to restricted access, an additional length of road is likely required for construction of the option.	Option 1 is strategically positioned to navigate around the primary working area within the North East corridor, thereby enhancing access efficiency. The access road length for construction workers, deliveries, and waste removal total approx. 6,400m from the Marcham road roundabout (A415 to SESRO Access road). Notably, a significant portion of this road infrastructure is not entirely "new" to the WTW since it will also serve the construction needs of SESRO.	Logistics
CON3D	Logistics - Haulage distance required for construction materials arrival on site to the placement location	Determine length using GIS and options layouts from option definition.	A	For WTW: Moderate haulage distance required.	The distance from Marcham road roundabout (A415 to SESRO Access road) to Option 1 is approximately 6,400m. This is a moderate haulage distance.	Logistics
CON3E	Logistics - Vehicle movements	Use vehicle movement estimates to assess different options.	R	Construction works likely to require a large number of vehicle movements and vehicle movements may be difficult.	The main difference between sites with regards to the number of vehicle movements is the relative number of pipe lengths required to be transported to site. All other material transportation is similar for all sites. Option 1 has approx. 8,300m length of larger diameter pipes (potable / raw / emergency) and approx. 1,950m length of the smaller diameter pipes (foul). This is estimated as a total of 352 trips, which is a large number of vehicle/truck deliveries.	Logistics
CON4B	Construction Complexity - Location conflict/opportunity with another engineering component of the scheme or other SRO/non-SRO schemes, e.g. STT, T2ST, SWOX/Farmoor	Expert judgement and knowledge of surrounding schemes	A	Location / layout of the option neither clashes nor provides an opportunity to be developed with another component of this scheme (or another scheme)	The site selection work is progressing on the assumption that the T2ST scheme will use the SESRO reservoir. The construction of the T2ST WTW within the SESRO boundary is an example of utilising opportunity to develop schemes alongside each other. Where possible, the road network within the SESRO boundary is being utilized for the T2ST pipeline corridors. Should a WTW be established in this area, it might necessitate the realignment of the canal, which could, in turn, affect the planned SESRO flood compensation strategy.	Construction complexity
CON4C	Construction Complexity - Minimise the number and complexity of additional structures/assets required or modifications to the existing structures/assets in order to facilitate the option, e.g. bridges, culverts, crossings	Determine using GIS and options layouts from option definition.	A	Option requires a moderately complex (mitigation likely) and/or moderate number of additional structures and/or modification to existing structures.	No modifications to the WTW compound required at this location. All options require the potable main to cross under the railway. The greatest unique complexity associated with Option 1 is the potable and foul pipeline corridor (Corridor IDs 13 & 6) intersecting with the main SESRO tunnel and the sweetening flow pipework.	Construction complexity
CON5A	3rd Party Impact - Potential to disrupt existing road network during enabling works and construction	Expert judgement	A	Disruption likely to be moderate	The potential disruption associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movement required for WTW and pipeline construction is expected to moderately impact the A34 and Marcham Road. Additionally, the option's position away from the pumping station will further increase the required vehicle movements, as previously covered in CON3E. Notably, no additional crossing points of existing road networks are associated with this site.	3rd Party Impact
CON5B	3rd Party Impact - Potential to disrupt existing rail network during enabling works and construction	Expert judgement	G	Disruption likely to be limited	No disruption to the rail network anticipated. A worst case scenerio is currently assumed, whereby no construction materials will be delivered via the rail siding. All WTW options necessitate the potable pipe to cross the railway (which is to be constructed by T2ST).	3rd Party Impact

CON7A	Ground - Terrain of site, and implications for the need for earthworks and engineered slopes	Use of lidar and civil 3D models to assess amount/location of earthworks required	G	Terrain is favourable to the design of assets and therefore reduces the amount of earthworks required	Generally, it is assumed that the WTW will be built at ground level (i.e., no deep excavations, using shallow foundations). Rough estimates using the Lidar data and assuming the site will be levelled for construction purposes (using the lowest point within the site boundary as reference base layer) show that site A will require approx. 14,000 m^3 of earthworks. Also, Option 1 is in a location that will be shielded by the embankment of the reservoir and will likley require very limited earthworks for landscaping and screening the site from view.	Construction complexity
CON7C	Ground - Impact of ground conditions on the complexity of design and construction	Use of expert judgement	G	Ground conditions are unlikely to increase the complexity of design and construction with likely only a minimal (if any) impact on cost or requirement for materials that are difficult to source	The geology of the options varies due to the regional dip. In the south-east of the SESRO site, there are layers of Gaulty Clay, Lower Greensand, Kimmeridge Clay, and Corallian. Conversely, the north-west portion of the site contains only the latter two layers. Despite the geological differences, it is not expected to significantly impact construction	Construction complexity
CON7E	Construction Complexity - Complexity of pipeline installation within corridors	Expert judgement	A	The pipeline route faces several challenges that increase its complexity and risk. These include passage through congested pinch points, risk of ground settlement, and/or obstacle avoidance	All options require the potable pipeline to cross the railway on the south of the reservoir and the foul pipework under the A34. Option 1 's pipeline corridor demands that all pipework—potable, raw, contingency, and foul—intersect with the sweetening flow pipework. Additionally, Option 1 has approximately 8,300m length of large diameter pipework and 10,250m overall pipework length, adding to its complexity. Additional construction pinch points include: • all four pipes crossing the ADC, sweetening flow pipework for the ADC as well as the EWD at three different points • The foul pipe also crosses the EWD at a separate point.	Construction complexity
Operability						
OPS1B	Safety - Access and egress for operational staff, visitors, deliveries and waste removal during normal operations and emergencies	Expert judgement	G	Access/egress can be provided	During typical operations, access restrictions in Option 1 are minimal. For emergency situations, major emergency services (Hospital, Police, Fire station) have good access to A415 and can easily reach site via the available and proposed routes, with Option 1 being approximately 8km away from three major emergency services in Abingdon which have been used as reference.	Health and Safety
OPS4C	Reliability - Impact of WTW location on gravity discharge of excess water e.g. overflows and contingency / commissioning discharges	Expert judgement	A	Pumping is required potentially introducing a single point of failure but mitigation measures can be introduced to avoid interruption to supply.	Contingency - In the worst-case scenario, the static head to overcome in the wet well is 55m. Option 1 includes 1,650m of contingency pipework. The ground level of Option 1 at its lowest point is 55.4m. This equates to a gradient of ~1 in 4,125. This is likely to provide an inadequate ground profile to facilitate gravity flow. Foul - Foul waste for all options will need to be pumped to Abington STW. Sludge generated during the water treatment process will be transferred via the foul pipe. Currently, it remains undecided whether the foul pipe serving the T2ST WTW will be shared with SESRO recreational facilities.	Operational Resilience
OPS5B	Adaptability - Flexibility for future modifications e.g. increasing reservoir storage volume, rail station at wantage and grove, construction of Marcham Bypass	Expert judgement	A	Option includes a limited degree of flexibility for future modifications	Option 1 has an area of approximately 0.19km^2, which leaves an additional 0.11km^2 for future expansion / modifications to the WTW. This is a limited degree of flexibility.	Operational Resilience
OPS7A	Sustainability - Reuse of assets or temporary works for permanent items, e.g. materials storage slab, haulage roads, compound car park	Expert judgement	A	Some potential for reuse of assets/temporary works	Option 1 entails establishing a new WTWs and presents limited potential for asset reuse or temporary works. Part of the temporary working area could be used for permanent WTW parking.	Operational Resilience
OPS8A	3rd Party Impact - Potential to disrupt existing road network during operation	Expert judgement	G	No disruption likely / possibility of enhancement	The proposed changes are anticipated to have minimal impact on the existing road network. Operational chemical deliveries are estimated at approximately 4 tankers per week. Access to Option 1 will be facilitated via Marcham Road using the A34, which should help reduce the impact on local villages.	Transport Planning
Relative Costs						
COS1	Capex cost of the option	Cost estimate calculation for each option.	A	CAPEX estimated to be 2% to 10% of the estimated Gate 2 CAPEX for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major cost differentiator will be the cost of the pipelines (to and from the site). Option 1 costs approximately 5% of the estimated Gate 2 (November 2022) Capex for the overall T2ST project.	Cost
Carbon Costs						
CAR1	Carbon emissions associated to the Capex of the option	Carbon estimate calculation for each option.	A	Emissions (tCO2e) estimated to be 2% to 10% of the estimated Gate 2 emissions (tCO2e) for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major differentiator will be the carbon associated with the pipelines (to and from the site). Option 1 accounts for approximately 4% of the estimated Gate 2 (November 2022) Capex Carbon emissions for the overall T2ST project.	Carbon
CAR3	Opportunity for mitigation e.g. smaller earthworks may lead to less carbon	Carbon estimate calculation for each option.	G	High likelihood and magnitude of mitigation opportunity.	Option 1 is in a location that will be partially screened by the embankment of the reservoir, but will however still require some earthworks for landscaping and screening the site from view, which has significant carbon emissions associated.	Carbon
Environmental Performance						
ENV1A	Minimise impacts on Special Area of Conservation	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Special Area of conservation (SAC) or potential SAC's within the boundary of the proposed WTW Option 1. The closest SAC to the proposed WTW is 4.5km to the north (Cothill Fen SAC).	Biodiversity and Nature Conservation
ENV1B	Minimise impacts on Special Protection Area	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Special Protection Areas (SPA) or potential SPA's within the boundary of the proposed WTW Option 1. The closest SPA to the WTW is Thames Basin Heaths SPA located 40.5km to the south-east.	Biodiversity and Nature Conservation
ENV1C	Minimise impacts on Ramsar	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Ramsar sites or potential Ramsar sites within the boundary of the proposed WTW Option 1. The closest Ramsar to the WTW is South-west London Waterbodies located 56.5km to the south-east.	Biodiversity and Nature Conservation
ENV1D	Minimise impacts on Site of Special Scientific Interest	Professional Judgement and use of MAGIC maps.	A	Construction area or access road located within statutory sites; mitigation may be required but option still feasible OR designated site indirectly impacted but mitigation likely to be effective	There are no Sites of Special Scientific Interest (SSSI) within the boundary of the proposed WTW Option 1. The closest SSSI to the WTW is Frilford Heath, Ponds and Fens SSSI located 2.5km to the north. The proposed WTW location is located within the SSSI Impact Risk Zone (IRZ) for Frilford Heath, Ponds and Fens SSSI and Barrow Farm Fen SSSI. There is potential for impact on the SSSI's through air pollution including industrial processes, slurry lagoons and combustion processes from industry.	Biodiversity and Nature Conservation
ENV1E	Minimise impacts on National Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no National Nature Reserves (NNR) within the boundary of the proposed WTW Option 1. The closest NNR to the WTW is located 4.8km to the north. Cothill NNR.	Biodiversity and Nature Conservation
ENV1F	Minimise impacts on Local Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Local Nature Reserves (LNR) within the boundary of the proposed WTW Option 1. The closest LNR to the WTW is located 5km to the north-east of the site. The site is called Abbey Fishponds LNR.	Biodiversity and Nature Conservation

ENV2A	Minimise impacts on Ancient Woodland	Natural England Ancient Woodland Maps and Professional Judgement.	G	No ancient woodland impacted	Historic mapping indicates that there is no ancient woodland present on-site	Biodiversity and Nature Conservation
ENV2B	Minimise impacts on Ancient and Veteran Trees	Woodland Trust Ancient Tree Inventory map search and professional judgement	A	Development in close proximity with potential indirect impact to ancient or veteran trees	There are no ancient or veteran trees recorded by the Woodland Trust's Ancient Tree Inventory on or close to this option. However, survey may identify trees that could be classified as ancient or veteran. As such, this option scores amber on a precautionary basis pending survey.	Biodiversity and Nature Conservation
ENV2C	Minimise impacts on Protected Trees	Check against published TPO dataset.	G	No protected trees impacted	No protected trees would be impacted.	Landscape & Visual
ENV2D	Minimise impacts on vegetation (including trees, woodland, hedges and shrubs)	Check against baseline resources and based upon high level knowledge of site from previous site visits. Professional judgement.	A	Direct impact on vegetation within a moderate proportion of construction footprint, which is of high arboricultural/amenity value (e.g. A or B grade) or biodiversity habitat in good condition. OR Direct impact on vegetation within large proportion of construction footprint, which is of lower arboricultural/visual amenity value (e.g. C grade) or biodiversity habitat in poor condition.	Construction of WTW Option 1 and associated pipelines will require the removal of hedgerow and broadleaved woodland habitat. This is assumed to be likely to include A or B grade trees.	Biodiversity and Nature Conservation and Landscape
ENV3	Minimise impacts on Local Wildlife Sites (LWS)	Professional Judgement and LWS Citation provided by TVERC.	G	No impacts to LWS	There are no LWS within the boundary of the proposed WTW Option 1. The closest LWS to the WTW and associated pipeline is located 1.3km to the west at The Cuttings and Hutchin's Copse LWS. The WTW pipeline is considered to be far enough away from the LWS that there will be no direct or indirect impact on the LWS.	Biodiversity and Nature Conservation
ENV4A	Minimise impacts on Scheduled monuments or activities which could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The closest Scheduled Monument to the limit of land assessed for the option is the Noah's Ark Scheduled Monument approximately 1.4km north west.	Historic Environment
ENV4B	Minimise impacts on listed buildings or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	Whilst the limit of land assessed is within 500m of Listed Buildings at Marcham Mill and Bridge to the north east the permanent infrastructure will be 720m away, with limited chance to alter visual setting.	Historic Environment
ENV4C	Minimise impacts on Registered Parks and Garden or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Registered Park and Garden of Albert Park in Abingdon lies over 4km north east of the option's limit of land assessed. Changes in setting from the option would not occur.	Historic Environment
ENV4D	Minimise impacts on Registered Battlefields or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Registered Battlefield of Chalfont lies 18km east of the option and changes to setting arising from the option can be discounted.	Historic Environment
ENV4E	Avoid impacts on World Heritage Sites or activities that could lead to a loss of significance, including setting	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Blenheim Palace World Heritage Site lies 19km to the north of the option and changes in setting to the asset can be discounted.	Historic Environment
ENV4F	Minimise impacts on conservation areas which could result in loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	Marcham Conservation Area lies 1.7km to the north of the limit of land assessed for the option. Changes in setting would not occur given the distance between the designation and the option.	Historic Environment
ENV5A	Minimise loss to non-designated built heritage	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Extensive loss of non-designated built heritage of low value within the permanent infrastructure zone and adverse changes to within a 500m area from the edges of the permanent infrastructure OR more limited effects on non-designated built heritage of medium value	The nearest non-designated historic structures are likely to be located in Marcham 1.7km to the north or along the A34 1.5km to the west. Changes to setting to assets there would not occur	Historic Environment
ENV5B	Minimise loss to paleoenvironmental remains	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	A	Extensive scale of loss or damage to medium value remains within the construction area and adverse changes to similar buried remains in a 1km area around the permanent infrastructure from temporary and permanent changes to local hydrogeological regimes OR more limited effects on remains of high value	The option lies 300m south east of the River Ock whose floodplain will contain paleoenvironmental remains, though the extent and significance of these remains are unknown. A medium value has been assumed for the purposes of optioneering.	Historic Environment
ENV5C	Minimise loss to non-designated historic landscapes	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	G	Extensive scale of loss or extensive changes to low value non-designated historic landscapes within the construction area and extensive changes to the setting of the same resource outside the permanent infrastructure OR more limited effects on non-designated historic landscapes of medium value	No such assets present within the HER dataset or obvious from aerial images.	Historic Environment
ENV5D	Minimise loss of non-designated archaeological remains	Professional judgement, incorporating the use of the IEMA's Principles of Cultural Heritage Assessment in the UK and the Chartered Institute for Archaeologists standard and guidance document for desk based assessment	R	Permanent infrastructure and construction area will result in extensive loss and / permanent damage to non-designated buried and extant archaeological remains worthy of national significance which can't be adequately mitigated through preservation by record	Scores red as there are two concentrations of non-designated archaeological remains identified with a potentially high value and the potential for further unknown buried archaeology. This could be mitigated but would be costly.	Historic Environment
ENV6C	Minimise impacts of groundwater flood risk.	Checking existing national and local records	G	No predicted impacts on groundwater flood risk	Design groundwater level is generally uniform across the site (currently taken as GL-1m). There is no additional information that specifies that there is a difference between the different sites.	Flood risk

ENV7A	Minimise disturbance of potentially contaminated land	Checking existing national and local records	A	Disturbance of potentially contaminated land with one or more of the following properties: -Unlikely to have significant / showstopping cost or program implications -Unlikely to cause significant harm to potential receptors -Can be easily mitigated and remediated	Potential land contamination is associated with the bombing range and the infilled canal which pipework may pass through. Option located on Grade 3a BMV agricultural soil (2008 detailed survey).	Land Quality
ENV7B	Minimise disturbance of potentially contaminated land specifically in relation to authorised and historic landfills	Checking existing national and local records	G	Not within authorised and historic landfills or previous industrial sites or within 250m of authorised and historic landfills or previous industrial sites	No landfills known to be located within 250m	Land Quality
ENV8	Minimise disturbance of land with known potential for Unexploded Ordnance (UXO)	Checking existing national and local records	G	No disturbance of land contaminated by UXO	Option is located on the historical Marcham Bombing range, within an a high UXO risk area classified by Zetica. A number of magnetic anomalies have been identified which were attributed to practice bombs in the 'target field' location. It is assumed that unexploded ordnance (UXO) threat would be mitigated for the entire study area prior to any mobilisation or construction work. Therefore it is expected that the magnetic anomalies which have been identified shall be cleared prior to construction work.	Land Quality
ENV9A	Minimise loss of terrestrial priority habitats (use narrative to describe type and quantum)	Use of aerial imagery, MAGIC maps and Professional Judgement	A	Priority habitat directly impacted but mitigation feasible	Habitats within the site of WTW Option 1 and associated pipeline include those which are classified as priority habitats under the NERC Act (2006). Priority habitats likely to be present include hedgerows, lowland mixed deciduous woodland and arable field margins.	Biodiversity and Nature Conservation
ENV9B	Minimise loss of aquatic priority habitats (use narrative to describe type and quantum)	Professional judgement based on knowledge of Water Framework Directive.	A	Priority habitat directly impacted but mitigation feasible	The pipeline associated with this option requires a crossing with the EWD at two separate locations. This means that the pipeline would need to be installed first to avoid disturbance but there is a potential for reduced habitat quality as the new EWD would largely need to be cut into fill (which would need to be a cohesive material) over the pipeline not in the existing ground profile as had been planned. There would need to be sufficient headroom between the bed of the channel and the soffit level of the pipe for this to work.	Aquatic Environment
ENV10A	Reduce effects on North Wessex Downs AONB and its setting	Professional judgement.	A	AONB and its setting likely to be affected. Effect is unlikely to be significant.	Introduction of water treatment works within the arable landscape would erode the setting of the North Wessex Downs National Landscape. However, while mitigation opportunities may be limited by the need to maintain an open habitat, the effect on the landscape character and tranquillity of the National Landscape and its setting would be unlikely to be significant due to the distance. Least visible option from the National Landscape.	Landscape & Visual
ENV10B	Reduce effects on local landscape character	Professional judgement.	R	Effect on local landscape character is likely to be significant.	Introduction of water treatment works within the arable landscape would erode the local landscape character. However, isolated location and could be absorbed into landscape by proposed reservoir embankment behind it through sensitive design. However, as mitigation opportunities may be limited by the need to maintain an open habitat, effect could potentially be significant locally. Site clearance for the construction of the WTW and installation of pipelines would require the removal of existing hedgerows and trees which are largely limited to field boundaries. Easements around the pipelines could limit planting. Pipelines would be buried so, on the whole, only construction effects are relevant to landscape effects and visual. With the exception of vegetation loss that cannot be replaced due to easements these effects would be temporary and therefore the location of the pipelines should not be a determining matter for the location of the WTW.	Landscape & Visual
ENV11A	Reduce effects on panoramic views from national trail, open access land and important viewpoints in AONB	Professional judgement.	A	Effect on panoramic views from national trail, open access land and important viewpoints in AONB unlikely to be significant.	Distant views are likely to be screened or partially screened by the reservoir embankment in panoramic views from the North Wessex Downs National Landscape including from The Ridgeway National Trail. Least visible option from the National Landscape. Effect unlikely to be significant.	Landscape & Visual
ENV11B	Reduce effects on sensitive local visual receptors	Professional judgement.	R	Effect on local views of sensitive visual receptors likely to be significant.	Water treatment works likely to be visible from local public rights of way (PRoW) and also in possible filtered middle-distance views from Marcham Mill. Possible distant filtered views through existing vegetation from edges of South Oxfordshire Crematorium and Marcham to the north, over 1.1km and 1.5km away respectively. Effect on most views not likely to be significant, but effects for closest views could potentially be significant.	Landscape & Visual
ENV12	Minimise disturbance/encroachment into Air Quality Management Area (AQMA)	Based on an understanding of the scale and nature of activities, air quality management areas (AQMAs) were identified in close proximity to the proposed works.	G	Site is located further than 1km from AQMA OR no construction traffic must go through an AQMA	Marcham AQMA is the closest AQMA to Option 1 and is approximately 1.7km north of the indicative permanent WTW footprint at its closest point. The anticipated construction and operational activities would likely lead to a negligible change in air quality.	Air Quality
ENV13	Minimise disturbance/encroachment into Groundwater Source Protection Zone (SPZ)	Magic maps	G	Site is within Zone 3 or not within a SPZ	No Groundwater Source Protection Zones within the vicinity of the SESRO site.	Aquatic Environment
ENV14A	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Cow Common Brook and Portobello Ditch' WFD waterbody (GB106039023360) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	R	Major adverse impacts likely; high risk to ability to attain Water Framework Directive objectives for this waterbody	The siting of the WTW at Option 1 would have a minor impact on one small watercourse which could be mitigated for. However, there is a serious risk/implication of the associated pipeline route requires a crossing with the Eastern Watercourse Diversion at two separate locations. There is a risk to WFD compliance since the narrative used to date within the WFD assessment and the accompanying Applicability Assessment is that the new watercourses around the site will be excavated and then left to recover without further interference. Since the pipeline is assumed to be open cut and is to be placed underneath the EWD there is a risk in the programme since the pipeline would need to be installed first to ensure no disturbance to the EWD once excavated. There is already the potential for poorer habitat quality since the EWD would have to cut into fill over the pipeline but if the pipeline is not dug before the EWD then there is a risk of significant disturbance to the EWD unless the pipeline is tunnelled and not open cut.	Aquatic Environment
ENV14B	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ock and tributaries (Land Brook confluence to Thames)' WFD waterbody (GB106039023430) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14C	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Thames (Evenlode to Thame)' WFD waterbody (GB106039030334) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14D	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Sandford Brook (source to Ock)' WFD waterbody (GB106039023410) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment

ENV14E	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Childrey Brook and Norbrook at Common' WFD waterbody (GB106039023380) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14F	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ginge Brook and Mill Brook' WFD waterbody (GB106039023660) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14G	Option does not affect Water Framework Directive (WFD) Quality Elements within one of WFD waterbodies downstream of the River Thame to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives. These WFD waterbodies include: - Thames Wallingford to Caversham - WFD waterbody GB106039030331 - Thames (Reading to Cookham) - WFD waterbody GB106039023233 - Thames (Cookham to Egham) - WFD waterbody GB106039023231 - Thames (Egham to Teddington) - WFD waterbody GB106039023232	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on these waterbodies.	Aquatic Environment
ENV15A	Maximise potential for future environmental benefits (terrestrial), e.g. increase tree planting	Professional Judgement	R	Site allows only the minimum environmental benefits to be realised	No specific space for environmental benefits and removes areas of broadleaved woodland and hedgerow habitat.	Biodiversity and Nature Conservation
ENV15B	Maximise potential for future environmental benefits (aquatic), e.g. increase wetlands area	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some additional environmental benefits to be realised	The siting of the WTW will not effect the delivery of environmental benefits. However, there is a serious risk that the associated pipeline reduces the habitat quality associated with the Eastern Watercourse Diversion as it will have to be sited on the same alignment of the pipeline for a significant length. To be possible a cohesive material would need to be installed on the pipeline and cut into to form the diversion.	Aquatic Environment
ENV16	Maximise flexibility in routing diverted watercourses so their habitats can be of sufficiently high quality to contribute to catchment Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some flexibility in routing watercourses / Good quality habitat options are available	The siting of the WTW will not affect the diverted watercourses. However, there is a serious risk that the associated pipeline reduces flexibility and habitat quality with the Eastern Watercourse Diversion as it will have to be sited along the same alignment of the pipeline for a significant length. To be possible, a cohesive material would need to be installed on the pipeline and cut into to form the diversion. This has the potential to reduce the overall habitat quality that can be delivered as a result.	Aquatic Environment
ENV17	Minimise disturbance/encroachment into Local Geological Sites (LGS)	Checking existing national and local records	G	Site is located more than 250m from LGS	No geological designations present	Biodiversity and Nature Conservation
ENV18A	Minimise impacts associated with Noise and Vibration as a consequence of the construction of the option	Professional judgement informed by published guidance such as BS5228 and LA 111, and experience of relevant schemes, including the 300km Strategic Pipeline Alliance scheme. Assumed that well established generic mitigation measures will be put into place as required. Assumed that well established generic mitigation measures will be put into place as required. Indicative RAG assessment, with Red band being the distance from the works site to the SOAEL+5dB distance, and Amber is from SOAEL+5dB distance to the SOAEL. Construction of WTW: Red 69m, Amber 70-380m, Green 381m. Professional judgement used in assigning a single RAG rating for each option under review, which includes a review of the number of properties in each band and how close they are located to the RAG boundaries. Property counts do not consider screening of receptors by nearby buildings, screening at second row of properties by first row of properties. This will result in a precautionary assessment of noise impacts. NOTES: buildings to be demolished are excluded from assessment, RAG bands based on assessment approach for residential properties but all NV sensitive receptors identified at Gate 2 are included in analysis.	G	Impacts unlikely, or adverse impacts are likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW site boundary ('Land to be assessed')): 470m - Rushey & Marcham Mill, Mill Road 1220m - Crematorium 1435m - Venn Mill (south of crematorium) [430m Ed. Centre; 1500m Vis.&Comm. Centre (to WTW footprint)] Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Likelihood of significant adverse effects: Construction: Low. Although there is the potential for elevated noise levels above the SOAEL at a property in the vicinity of the pipeline, it is anticipated that open-cut trenching works would be restricted to daytime only works and would progress quickly, so would not trigger the temporal element of the BS5228-1 noise criteria. It is also assumed that suitable noise mitigation would be adopted during pipe laying works when close to noise sensitive properties.	Noise
ENV18B	Minimise impacts associated with Noise and Vibration as a consequence of the operation of the option	Professional judgement informed by published guidance such as BS4142, BS8233 and the WHO Night Noise Guidelines for Europe and experience of relevant schemes including Frankley WTW extension and a UU WTW. Assumed that well established generic mitigation measures will be put into place as required. The assessment approach is as per that outlined above (ENV18A), but with the following RAG distances for operational noise impacts: Operation of WTW: Red 74m, Amber 75-400m, Green 401m.	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW site boundary ('Land to be assessed')): 470m - Rushey & Marcham Mill, Mill Road 1220m - Crematorium 1435m - Venn Mill (south of crematorium) [430m Ed. Centre; 1500m Vis.&Comm. Centre (to WTW footprint)] Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Advantages: Operational noise from WTW - only one receptor within 1km Likelihood of significant adverse effects: Operation: Low. Assumes no operational noise from proposed pipeline routes (Raw, Potable, Foul/Sludge & Contingency)	Noise
ENV19A	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the construction of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) and no statutory designated sites in the vicinity of Option 1. However, there is a residential property (Westbury House, Hanney Road), which is less than 50m from the associated pipeline (assuming open cut / cut & cover). It is considered that there are no proposed dust-generating construction activities that could not be managed using normal good practices (see IAQM construction dust guidance, 2024) to prevent significant effects at any "off-site" receptor.	Air Quality
ENV19B	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the operation of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) and no statutory designated sites in the vicinity of Option 1. During operation of the WTW, given the likely size / number of required diesel fuelled generator(s) and distance to the nearest sensitive receptors, the potential effects would likely lead to a negligible change in air quality.	Air Quality

ENV20A	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the construction of the option	Professional judgement.	G	Barely perceptible changes to visual amenity, with no or little effect on local community	Isolated from communities and will be seen in the context of the reservoir embankment behind it. Little change to visual amenity of local communities during construction, including due to lighting, likely to be limited due to isolated location.	Landscape & Visual
ENV20B	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the operation of the option	Professional judgement.	G	Barely perceptible changes to visual amenities, with no or little effect on local community	Isolated from communities and will be seen in the context of the reservoir embankment behind it. Little change to visual amenity of local communities during operation, including due to lighting, likely to be limited due to isolated location.	Landscape & Visual
ENV21A	Minimise impacts associated with solid discharge during construction.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV21B	Minimise impacts associated with solid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids unlikely	Pollution
ENV22A	Minimise impacts associated with liquid discharge during construction,.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV22B	Minimise impacts associated with liquid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Liquid discharge release should be prevented by appropriate site management.	Pollution
Community and Planning Considerations						
CPC1	Distance to the nearest property that will stay during construction (metres)	GIS	G	501m plus from the nearest property	The closest property to Option 1 is the South Oxfordshire Crematorium, which is a distance of approx. 1,650m away. All other properties are >1,800m away from this option.	Socio-Economic
CPC2	Minimise impacts on local community during construction associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during construction	No impacts during construction.	Socio-Economic
CPC3	Minimise impacts on local community during operation associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during operation	No impacts during operation.	Socio-Economic
CPC4A	Are public rights of way disrupted or adversely affected?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	G	No recreational resource / right of way are disrupted or affected. Sites with no recreational activities	WTW would not affect PRoW anymore than the reservoir construction would. PRoW are being reinstated around the WTW.	Socio-Economic
CPC4B	Are there opportunities to create or improve linkages of Public Rights of Way (PRoW) and recreational routes?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	A	Links to a recreational resource / right of way of local importance can be enhanced	PRoW are being reinstated around the WTW.	Socio-Economic
CPC5	Maximise potential opportunity for recreational benefits	GIS analysis of PRoW, open spaces, cycle routes, canals, other forms of regional/nationally important receptors (e.g. National Cycle Routes), and community assets.	A	Option allows some additional recreational benefits to be realised	WTW positioning avoids dissuading visitors to the reservoir.	Socio-Economic
CPC6	Support the realisation of socio-economic incentives on SESRO, including employment, skills, tourism, sustainable travel, connecting people with nature and environmental education	GIS analysis of footprint, community assets, private residents, and businesses. Also awareness of overall project objectives is needed to conclude if the designs align with these.	G	Site supports the social-economic incentives of the overall scheme	WTW positioning avoids dissuading visitors to the reservoir.	Socio-Economic
CPC7	Minimise overall SESRO Order Limits extent and land acquisition, without compromising SESRO needs and project benefits	Spatial comparison of land that would likely be included in the DCO Order Limits, including construction working areas, access and highways or PRoW interactions.	G	Requires minimum Order Limits extent	The WTW option is within the area of land expected to be required for reservoir construction works and site extent (including landscaping) in operation, and within the area safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031, requiring the minimum Order Limits extent.	Consenting
CPC8	Aim for consistency with published and (insofar as possible) emerging Local Plan land use allocations	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in existing and any emerging Local Plan documents and any Supplementary Planning Documents.	G	Low or no impact	The WTW option is within the land safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031. The same remains true for the consultation draft Joint Local Plan 2041. No land use allocation conflicts with the Oxfordshire County Council Minerals and Waste Local Plans.	Consenting
CPC9	Aim for consistency with any adopted Neighbourhood Plan policy applicable to the land area affected	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in any made Neighbourhood Plan.	A	Negotiation required with Parish Council to accommodate scheme within Neighbourhood Plan	The WTW option is within the area of the East Hanney Neighbourhood Plan, which is awaiting referendum that will take place in April, and the Made Drayton Neighbourhood Plan. The WTW option conflicts with policy EHNP9 - Nature Recovery Network and Biodiversity of the East Hanney NP, as the WTW is located in an area for the purpose of promoting nature recovery and enhancement of biodiversity. Drayton also has a policy that development proposals are required to protect and enhance biodiversity (P-S1: Biodiversity).	Consenting
CPC10	Avoid development of infrastructure within specifically designated areas or their setting, as applicable (e.g. Green Belt, AONB, Common Land, Open Space)	Spatial comparison with designated sites, their settings, and the nature of development works expected.	G	Does not require development of above-ground infrastructure within these designations or development likely to have more than a negligible effect on the setting (where applicable)	Not located within a specifically designated area, such as Green Belt, AONB, Common Land or Open Space.	Consenting
CPC11	Avoid encroachment on any safeguarded land in minerals and waste policy, unless the minerals can be beneficially utilised as a result	Spatial comparison of allocated sites and review of policy wording in existing and any emerging Waste and Minerals Local Plan documents.	G	Low or no impact	Not located in minerals safeguarding area or on a site allocated for minerals or waste uses.	Consenting

CPC12	Ability to integrate with existing nationally-significant infrastructure, statutory undertakers' major infrastructure, or any proposed future Nationally Significant Infrastructure Projects (NSIP) (such as that of National Highways, Environment Agency, Network Rail)	Review of NSIP projects on PINS's register; review of Network Rail and National Highways investment plans; spatial review of statutory undertakers' assets.	G	Low or no interaction with existing infrastructure or proposed Nationally Significant Infrastructure Project (NSIP)	No NSIPs currently registered. No known proposals from Network Rail or National Highways.	Consenting
CPC13	Minimise the consenting complexity due to the need for additional consents and licenses that may be required outside the Development Consent Order (DCO), e.g. additional Flood Risk Activity Permit, Environmental Permit, abstraction/discharge Licence, European protected species licence, etc	Review of the nature of expected development works against the list of other consents and licenses developed at Gateway 2.	A	One or more additional consent/license required	The WTW option will require an Environmental Permit for the discharge of water into surface or groundwater. Option 1 will also require Land Drainage Consent for works in, over, under of affecting the flow of an ordinary watercourse and a standard or bespoke Flood Risk Activity Permit will also be required as the WTW is in Flood Zone 3.	Consenting
CPC14	Avoid or minimise the need for any consequential development consenting (i.e. displacement or alteration of other development)	Review of existing development within the likely land-take, its nature and scale.	G	No existing development requires planning permission to relocate or alter	There are no planning applications that would be impacted by the WTW or the pipeline. There are no major existing development in use either, rather the WTW and associated pipeline would be located on what is currently arable fields. Utility diversions are expected to be required, but this would likely be the case for SESRO works in this area, and would either form part of the DCO as associated development or potentially could be delivered through statutory undertaker permitted development.	Consenting
CPC15	Minimise interfaces/reliance on external governing/third parties (e.g. Removing the canal removes a stakeholder, reducing interfaces and permissions required from Network Rail, National Highways, National Grid)	Review GIS layers for services against the options. Expert Judgement.	A	Several manageable interfaces with others	Considering the WTW is planned on the SESRO project site and will be receiving raw water from the reservoir, it will be relying on the SESRO programme and its associated activities (most especially the recreational activates planned on the site). The location of Option 1 is independent of main railway lines or major roads, electricity and telecommunication cables, and any other utilities (including water and sewerage lines and gas mains). It will only have minimal interfaces with shared road for used for operations and recreation, with the nearest recreation building being approx. 600m away from the site. However, there is a canal that crosses the site (Wilts and Berks canal) which will require interaction with The Wilts and Berks Canal Trust. However, planned corridor for the canal restoration has been incorporated in the SESRO design.	Consenting
Property & Land Acquisition						
PRP1	Minimise loss of sensitive properties, i.e. residential, commercial, green belt, common land, historical or community assets due to project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of sensitive properties	Based on the information held at the moment, this option does not include the permanent or temporary loss of sensitive properties.	Property & Land Acquisition
PRP2	Minimise loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets due project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of allocated land for higher value or social value properties	Based on the information held at the moment, this option does not include the loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets.	Property & Land Acquisition
PRP3	Minimise permanent loss of best and most versatile agricultural land (grades 1, 2 and 3)	Review of agricultural grading layer on ArcGIS, based on 2019 Provisional Agricultural Land Classification	G	No Grade 1 or 2 agricultural land is affected and loss of <50% Grade 3 agricultural land	Grade 4 land.	Property & Land Acquisition
PRP4	Assessment of Land and Property asset costs and associated compensation due under the Compensation Code	Review of land use / designation on ArcGIS	G	Land acquisition costs likely to be relatively low.	Based on the information held, the likely acquisition costs will be relatively low.	Property & Land Acquisition
PRP5	Assessment of special land considerations, including Special Category Land (SCL) and utility infrastructure, national asset protection agencies and Crown bodies	Review of affected landowners	G	Nature and / or extent Special Category Land is likely to cause low consenting risk	Based on the information held, there appears to be no Special Category Land.	Property & Land Acquisition
PRP6	Assessment of disruption to landowners' access to their land during construction and operation	Review location in conjunction with existing road network	G	Low disruption to landowners' access to their land during construction and operation	The construction of the reservoir will change the access routes in the area, and so it is assumed that construction of the water treatment works will not directly cause a problem with access to land in the area.	Property & Land Acquisition

B. WTW Placement Option 2 Criteria Workbook

Water Treatment Works - Option 2

Criteria code	Criteria Description	Method of Assessment	RAG	Description of RAG	Narrative	Sub-Theme
Constructability						
CON1	Safety - Risk of endangering construction workers or members of the public during construction e.g. water, ground, height, rail, road and utilities	Look at programme and list types of construction involved. Identify any that could potentially score red or amber. Sub-list of activities which would make it amber i.e. Tunnelling = Amber	A	Works can be constructed safely but enhanced control measures required	Important construction activities associated with the SESRO construction program need to be taken into account during the installation of the WTW and associated pipelines. Distinguishing features of this option include the proximity of the WTW site and associated construction compound to the main SESRO construction compound and pumping station. This close location introduces additional risks, particularly related to significant transportation, material handling, and plant movements. Additional considerations related to Option 2 with regards to laying of the associated pipework include the following: • Potable pipeline crossing with the Railway • Foul pipeline crossing A34. • Pipeline corridor housing the potable and foul pipeline cross the EWD and SESRO conveyor tunnel at 2 unique points. All these will require enhanced safety control measures. Also, Options 2 has an overhead high voltage cable crossing the site, which will demand additional safety considerations. Further enhanced control measures are needed to account for the substantial earthworks associated with the SESRO construction, albeit these should be managed by the SESRO contractor.	Health and Safety
CON2A	Programme - Duration, longest /shortest, but also consider whether the longer duration has an impact on the overall scheme programme	Compare differences in the programmes which would materialise from different options. Consider earthworks seasons.	G	Unlikely to extend the duration of the relevant area of works (e.g. road, rail siding or intake/offtake construction) compared to the Gate 2 SESRO programme and unlikely to impact on overall SESRO Gate 2 programme.	The program timescale may be influenced by several key factors, including pipework length, material transport, and SESRO compound activity. Due to the position of Option 2 within the north-east corridor, there is a reduced need for longer pipelines with larger diameters (for potable, raw, and contingency purposes). Option 2 is located right next to the raw water pumping station (RWPS) (for raw and contingency connections) and is centrally positioned with respect to the southern SESRO border (for potable connection) and eastern SESRO border (for foul connection). It is important to acknowledge that the programme impact assessment has been conducted based on potential T2ST programme extensions. The installation of the T2ST WTW is not anticipated to affect the SESRO programme. The associated pipeline installations are likely to occur early in the SESRO programme, and they will be integrated in a manner that minimizes disruption and does not extend the SESRO programme duration. However, it is essential to note that an overall T2ST programme has not yet been finalized, and therefore, the full interactions with the T2ST programme have not been thoroughly assessed.	Programme
CON2C	Programme - Dependencies i.e. proximity or physical relationships between elements of scope that introduce programme dependencies	Is the options on the critical path? Will it impact other critical activities?	A	Several major dependencies/ multiple minor dependencies	Construction of the T2ST WTW alongside the SESRO reservoir introduces dependencies for all options. If the contractor for SESRO and T2ST (within the SESRO boundary) is the same, the risk associated with program disruption and dependencies is greatly reduced. T2ST construction is due to start in 2034, to be brought into service by 2040. SESRO construction is due to start in 2024, to be brought into service by 2040. The T2ST WTW pipeline corridors follow the access road around the reservoir, introducing a program dependency. Construction of the T2ST WTW is dependent on the completion of various access roads and construction compounds. The T2ST WTW is also dependent on the completion of the SESRO reservoir to enable operation of the works.	Programme
CON2D	Programme - Risk	Are there items in the construction which have a significant programme risk	R	Major programme risk	The risk associated with Option 2 is partially reduced due to the smallest length of pipework required. However, there exists additional programmatic risk arising from the constricted and busy nature of the north-east corridor. Various other elements of the SESRO scheme are to be constructed around the vicinity of the works compound.	Programme
CON3A	Logistics - Space available for construction and materials storage	Determine space constraints using GIS and options layouts from option definition.	A	Limited / restricted space	In Option 2, the WTW site and construction compound fit within the designated area, but it's constrained. Limited space hinders material storage and compound expansion. Additional restrictions apply due to congested nature of the north-east corridor. Efficient planning would be crucial to navigate these challenges.	Logistics
CON3B	Logistics - Suitable and efficient access for construction workers, deliveries and waste removal including minimisation of lengths of new roads for access during construction	Determine method of access using GIS and options layouts from option definition.	A	Due to restricted access, an additional length of road is likely required for construction of the option.	Option 2, situated within the North East corridor, will experience heightened vehicle and pedestrian activity. Effective traffic management measures will help mitigate the associated risks. The access road length for construction workers, deliveries, and waste removal totals approx. 4,000m from Marcham road roundabout (A415 to SESRO Access road). Notably, a significant portion of this road infrastructure is not entirely "new" to the WTW since it will also serve the construction needs of SESRO.	Logistics
CON3D	Logistics - Haulage distance required for construction materials arrival on site to the placement location	Determine length using GIS and options layouts from option definition.	A	For WTW: Moderate haulage distance required.	The distance from Marcham road roundabout (A415 to SESRO Access road) to Option 2 is approximately 4,000m. This is a moderate haulage distance.	Logistics
CON3E	Logistics - Vehicle movements	Use vehicle movement estimates to assess different options.	A	Construction likely to add vehicle movements.	The main difference between sites with regards to the number of vehicle movements is the relative number of pipe lengths required to be transported to site. All other material transportation is similar for all sites. Option 2 has approx. 3,850m length of larger diameter pipes (potable/raw/emergency) and 800m length of the smaller diameter pipes (foul). This is estimated as a total of 163 trips, which is a significant number of vehicle/truck deliveries.	Logistics
CON4B	Construction Complexity - Location conflict/opportunity with another engineering component of the scheme or other SRO/non-SRO schemes, e.g. STT, T2ST, SWOX/Farmoor	Expert judgement and knowledge of surrounding schemes	R	Location / layout of option clashes with another component of this scheme (or another scheme) which is already set or would be difficult to change	WTW Option 2 is situated where the SESRO construction compound is planned to be located and in close provimity to the pumping station and tunneling operations. As per the Costain SESRO & T2ST Interface Technical Note: 'This will cause clashes within the current SESRO construction programme. It is not currently considered feasible to house both the new WTW and the compound in the same location.' Various alternative options have been assessed, although the original location is deemed to still be favourable. The site selection work is progressing on the assumption that the T2ST scheme will use the SESRO reservoir. The construction of the T2ST WTW within the SESRO boundary is an example of utilising opportunity to develop schemes alongside each other. Where possible, the road network within the SESRO boundary is being utilized for the T2ST pipeline corridors	Construction complexity
CON4C	Construction Complexity - Minimise the number and complexity of additional structures/assets required or modifications to the existing structures/assets in order to facilitate the option, e.g. bridges, culverts, crossings	Determine using GIS and options layouts from option definition.	R	Option requires a complex and/or high number of additional structures and/or modifications to existing structures.	No modifications to the WTW compound required at this location. All options require the potable main to cross under the railway. The greatest unique complexity associated with Option 2 is the potable and foul pipeline corridor (Corridor IDs 13 & 6) intersecting with the main SESRO tunnel. In addition, there are other main activities in the location, including the RWPS, which would require deep excavations and necessitate temporary structures which may impact the WTW construction activities.	Construction complexity
CON5A	3rd Party Impact - Potential to disrupt existing road network during enabling works and construction	Expert judgement	A	Disruption likely to be moderate	The potential disruption associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movement required for WTW and pipeline construction is expected to moderately impact the A34 and Marcham Road. However, the option's position close to the pumping station slightly minimises the required increase in vehicle movements, as previously covered in CON3E. Notably, no additional crossing points of existing road networks are associated with this site.	3rd Party Impact
CON5B	3rd Party Impact - Potential to disrupt existing rail network during enabling works and construction	Expert judgement	G	Disruption likely to be limited	No disruption to the rail network anticipated. A worst case scenerio is currently assumed, whereby no construction materials will be delivered via the rail siding. All WTW options necessitate the potable pipe to cross the railway (which is to be constructed by T2ST).	3rd Party Impact

CON7A	Ground - Terrain of site, and implications for the need for earthworks and engineered slopes	Use of lidar and civil 3D models to assess amount/location of earthworks required	G	Terrain is favourable to the design of assets and therefore reduces the amount of earthworks required	Generally, it is assumed that the WTW will be built at ground level (i.e., no deep excavations, using shallow foundations). Rough estimates using the Lidar data and assuming the site will be levelled for construction purposes (using the lowest point within the Option 2 boundary as reference base layer) show that Option 2 will require approx. 30,000m^3 of earthworks. However, it should be noted that Option 2 is in a location that may pose challenges for landscaping and hiding the WTW from view, due to space limitations and proximity to other major activities (which is also covered in ENV14A and CPC15).	Construction complexity
CON7C	Ground - Impact of ground conditions on the complexity of design and construction	Use of expert judgement	G	Ground conditions are unlikely to increase the complexity of design and construction with likely only a minimal (if any) impact on cost or requirement for materials that are difficult to source	The geology of the options varies due to the regional dip. In the south-east of the SESRO site, there are layers of Gaulty Clay, Lower Greensand, Kimmeridge Clay, and Corallian. Conversely, the north-west portion of the site contains only the latter two layers. Despite the geological differences, it is not expected to significantly impact construction	Construction complexity
CON7E	Construction Complexity - Complexity of pipeline installation within corridors	Expert judgement	G	Pipeline route has few challenges with few complex obstacles and pinch points	All options require the potable pipeline to cross the railway on the south of the reservoir and the foul pipework under the A34. Option 2 has approximately 3,850m length of large diameter pipework and 4,650m overall pipework length, and thus has fewer challenges with regards the installation of the pipework. In addition, the pipeline corridor for the potable water will cross the tunnelling for the intake / outfall of the reservoir at one point. This introduces a complexity to the installation / construction of the pipework. However, conversations with the tunnelling team indicate that this is manageable. Also, pipeline corridor housing the potable and foul pipeline cross the EWD at unique points. Option 2 also has an overhead high voltage cable crossing the site, which will introduce additional complexities.	Construction complexity
Operability						
OPS1B	Safety - Access and egress for operational staff, visitors, deliveries and waste removal during normal operations and emergencies	Expert judgement	G	Access/egress can be provided	During typical operations, access restrictions in Option 2 are minimal. For emergency situations, major emergency services (Hospital, Police, Fire station) have good access to A415 and can easily reach site via the available and proposed routes, with Option 2 being approximately 6km away from the three main emergency services in Abingdon used as reference.	Health and Safety
OPS4C	Reliability - Impact of WTW location on gravity discharge of excess water e.g. overflows and contingency / commissioning discharges	Expert judgement	A	Pumping is required potentially introducing a single point of failure but mitigation measures can be introduced to avoid interruption to supply.	Contingency -In the worst-case scenario, the static head to overcome in the wet well is 55m. Option 2 includes 150m of contingency pipework. The ground level of Option A at its lowest point is 55.5m. This equates to a gradient of ~1 in 300. There is the potential to facilitate gravity transfer of contingency flows for this option. Foul - Foul waste for all options will need to be pumped to Abington STW. Sludge generated during the water treatment process will be transferred via the foul pipe. Currently, it remains undecided whether the foul pipe serving the T2ST WTW will be shared with SESRO recreational facilities.	Operational Resilience
OPS5B	Adaptability - Flexibility for future modifications e.g. increasing reservoir storage volume, rail station at wantage and grove, construction of Marcham Bypass	Expert judgement	R	Option includes no flexibility for future modifications	Option 2 has an area of approximately 0.14km^2, which leaves about 0.06km^2 for future expansion / modifications to the WTW. However, due to the proximity of other structures and activities in this location, there is no flexibility for future modifications.	Operational Resilience
OPS7A	Sustainability - Reuse of assets or temporary works for permanent items, e.g. materials storage slab, haulage roads, compound car park	Expert judgement	A	Some potential for reuse of assets/temporary works	Option 2 involves creating a new WTW with limited potential for asset reuse or temporary works. Option 2 was previously considered as a potential to serve as parking (standard & grasscrete). However, further collaboration with architects and planners is needed to assess feasibility for post-construction parking within the WTW construction compound.	Operational Resilience
OPS8A	3rd Party Impact - Potential to disrupt existing road network during operation	Expert judgement	A	Disruption likely to be limited	The proposed changes are anticipated to have minimal impact on the existing road network. Operational chemical deliveries are estimated at approximately 4 tankers per week. Access to Option 2 will be facilitated via Marcham Road using the A34, which should help reduce the impact on local villages. The location of Option 2 directly in the centre of the North East corridor may introduce occasional minor disruption to the public accessing recreational facilities associated with the reservoir. Whilst this access road is technically not existing, it will be constructed for SESRO separate to the WTW and is therefore considered within the RAG assessment.	Transport Planning
Relative Costs						
COS1	Capex cost of the option	Cost estimate calculation for each option.	A	CAPEX estimated to be 2% to 10% of the estimated Gate 2 CAPEX for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major cost differentiator will be the cost of the pipelines (to and from the site). Option 2 costs approximately 2% of the estimated Gate 2 (November 2022) Capex for the overall T2ST project.	Cost
Carbon Costs						
CAR1	Carbon emissions associated to the Capex of the option	Carbon estimate calculation for each option.	G	Emissions (tCO2e) estimated to be < 2% of the estimated Gate 2 emissions (tCO2e) for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major carbon differentiator will be the carbon associated with the pipelines (to and from the site). Option 2 accounts for approximately 1.8% of the estimated Gate 2 (November 2022) Capex Carbon emissions for the overall T2ST project.	Carbon
CAR3	Opportunity for mitigation e.g. smaller earthworks may lead to less carbon	Carbon estimate calculation for each option.	A	Limited likelihood and magnitude of mitigation opportunity.	Option 2 is in a location that will pose challenges for landscaping and hiding the WTW from view of the public (especially users of the recreational facility), due to space limitations and proximity to other major activities (which is also covered in ENV14A and CPC15). This means potentially additional earthworks will be needed, which has associated carbon emissions.	Carbon
Environmental Performance						
ENV1A	Minimise impacts on Special Area of Conservation	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Special Area of conservation (SAC) or potential SAC's within the boundary of the proposed WTW Option 2. The closest SAC to the proposed WTW is 4.7km to the north (Cothill Fen SAC).	Biodiversity and Nature Conservation
ENV1B	Minimise impacts on Special Protection Area	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Special Protection Areas (SPA) or potential SPA's within the boundary of the proposed WTW Option 2. The closest SPA to the WTW is Thames Basin Heaths SPA located 41km to the south-east.	Biodiversity and Nature Conservation
ENV1C	Minimise impacts on Ramsar	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Ramsar sites or potential Ramsar sites within the boundary of the proposed WTW Option 2. The closest Ramsar to the WTW is South-west London Waterbodies located 56.5km to the south-east.	Biodiversity and Nature Conservation
ENV1D	Minimise impacts on Site of Special Scientific Interest	Professional Judgement and use of MAGIC maps.	A	Construction area or access road located within statutory sites; mitigation may be required but option still feasible OR designated site indirectly impacted but mitigation likely to be effective	There are no Site of Special Scientific Interest (SSSI) within the boundary of the proposed WTW Option 2. The closest SSSI to the WTW is Barrow Farm Fen SSSI located 2.6km to the north. The proposed WTW location is located within the SSSI Impact Risk Zone (IRZ) for Barrow Farm Fen SSSI. There is potential for impact on the SSSI's through air pollution including industrial processes, slurry lagoons and combustion processes from industry.	Biodiversity and Nature Conservation

ENV1E	Minimise impacts on National Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no National Nature Reserves (NNR) within the boundary of the proposed WTW Option 2. The closest NNR to the WTW is located 5.1km to the north. Cothill NNR.	Biodiversity and Nature Conservation
ENV1F	Minimise impacts on Local Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no LNR within the boundary of the proposed WTW Option 2. The closest LNR to the WTW is located 5.1km to the north-east of the site. The site is called Abbey Fishponds LNR.	Biodiversity and Nature Conservation
ENV2A	Minimise impacts on Ancient Woodland	Natural England Ancient Woodland Maps and Professional Judgement.	G	No ancient woodland impacted	Historic mapping indicates that there is no ancient woodland present on-site	Biodiversity and Nature Conservation
ENV2B	Minimise impacts on Ancient and Veteran Trees	Woodland Trust Ancient Tree Inventory map search and professional judgement	A	Development in close proximity with potential indirect impact to ancient or veteran trees	There are no ancient or veteran trees recorded by the Woodland Trust's Ancient Tree Inventory on or close to this option. However, survey may identify trees that could be classified as ancient or veteran. As such, this option scores amber on a precautionary basis pending survey.	Biodiversity and Nature Conservation
ENV2C	Minimise impacts on Protected Trees	Check against published TPO dataset.	G	No protected trees impacted	No protected trees would be impacted.	Landscape & Visual
ENV2D	Minimise impacts on vegetation (including trees, woodland, hedges and shrubs)	Check against baseline resources and based upon high level knowledge of site from previous site visits. Professional judgement.	G	No direct impact on vegetation which is of high arboricultural/amenity value (A or B grade) or biodiversity habitat in good condition. OR Limited direct impact on vegetation which is of lower arboricultural/visual amenity value (e.g. C grade) or biodiversity habitat in poor condition.	Construction of WTW Option 2 and associated pipelines will require the removal of hedgerow habitat. This is assumed to be unlikely to include A or B grade trees. The majority of impacts will be restricted to arable fields with limited biodiversity value.	Biodiversity and Nature Conservation and Landscape
ENV3	Minimise impacts on Local Wildlife Sites (LWS)	Professional Judgement and LWS Citation provided by TVERC.	G	No impacts to LWS	There are no LWS within the boundary of the proposed WTW Option 2. The closest LWS to the WTW and associated pipeline is located 1.3km to the west at The Cuttings and Hutchin's Copse LWS. The WTW pipeline is considered to be far enough away from the LWS that there will be no direct or indirect impact on the LWS.	Biodiversity and Nature Conservation
ENV4A	Minimise impacts on Scheduled monuments or activities which could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The option is 1.7km south west of Sutton Wick Scheduled Monument and 1.6km north west of a Scheduled settlement site.	Historic Environment
ENV4B	Minimise impacts on listed buildings or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The nearest Listed Buildings to the option are Marcham Mill and Bridge over 900m to the north west and 930m to the south east in Drayton. It is unlikely that the setting of the assets would change solely as a result of the option.	Historic Environment
ENV4C	Minimise impacts on Registered Parks and Garden or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Registered Park and Garden of Albert Park lies 3.2km north east of the option. There would be no change to the designation arising from this option.	Historic Environment
ENV4D	Minimise impacts on Registered Battlefields or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The 1643 Battle of Chalgrove lying 17km east of the option is the nearest Registered Battlefield and changes to setting will not occur.	Historic Environment
ENV4E	Avoid impacts on World Heritage Sites or activities that could lead to a loss of significance, including setting	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Blenheim Palace World Heritage Site lies 19.2km to the north of the option and changes to setting will not be a material consideration.	Historic Environment
ENV4F	Minimise impacts on conservation areas which could result in loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	Drayton is the closest Conservation Area to the land assessed for the option, being 860m to the south east of it. The setting of the designation would not experience changes from the option location.	Historic Environment
ENV5A	Minimise loss to non-designated built heritage	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Extensive loss of non-designated built heritage of low value within the permanent infrastructure zone and adverse changes to within a 500m area from the edges of the permanent infrastructure OR more	The nearest non-designated built heritage will lie approximately over 500m to the south east of the limit of land assessed at the northern end of the village of Drayton. No indication of any specific assets on the available dataset but that is more a representation of archaeological assets rather than existing historic built heritage.	Historic Environment
ENV5B	Minimise loss to paleoenvironmental remains	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	A	Extensive scale of loss or damage to medium value remains within the construction area and adverse changes to similar buried remains in a 1km area around the permanent infrastructure from temporary and permanent changes to local	The limit of land assessed lies approximately 750m south east of the River Ock. The nature and extent of the palaeoenvironment is unknown, but a medium value is assumed for optioneering purposes	Historic Environment
ENV5C	Minimise loss to non-designated historic landscapes	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	G	Extensive scale of loss or extensive changes to low value non-designated historic landscapes within the construction area and extensive changes to the setting of the same	No such assets present within the HER dataset or obvious from aerial images.	Historic Environment
ENV5D	Minimise loss of non-designated archaeological remains	Professional judgement, incorporating the use of the IEMA's Principles of Cultural Heritage Assessment in the UK and the Chartered Institute for Archaeologists standard and guidance document for desk based assessment	R	Permanent infrastructure and construction area will result in extensive loss and / permanent damage to non-designated buried and extant archaeological remains	Scores red as there is a concentration of archaeological remains identified as being of high value within the option location, with a further high potential for unknown buried archaeology. This could be mitigated but would be costly.	Historic Environment
ENV6C	Minimise impacts of groundwater flood risk.	Checking existing national and local records	G	No predicted impacts on groundwater flood risk	Design groundwater level is generally uniform across the site (currently taken as GL-1m). There is no additional information that specifies that there is a difference between the different sites.	Flood risk

ENV7A	Minimise disturbance of potentially contaminated land	Checking existing national and local records	A	Disturbance of potentially contaminated land with one or more of the following properties: - Unlikely to have significant / showstopping cost or program implications - Unlikely to cause significant harm to potential receptors - Can be easily mitigated and remediated	The only potential source of contamination is what appear to be farm buildings approximately 100m south west. Option located on Grade 2 and 3a BMV agricultural soil (2008 detailed survey).	Land Quality
ENV7B	Minimise disturbance of potentially contaminated land specifically in relation to authorised and historic landfills	Checking existing national and local records	G	Not within authorised and historic landfills or previous industrial sites or within 250m of authorised and historic landfills or previous industrial sites	No landfills known to be located within 250m	Land Quality
ENV8	Minimise disturbance of land with known potential for Unexploded Ordnance (UXO)	Checking existing national and local records	G	No disturbance of land contaminated by UXO	Low risk UXO area (Zetica)	Land Quality
ENV9A	Minimise loss of terrestrial priority habitats (use narrative to describe type and quantum)	Use of aerial imagery, MAGIC maps and Professional Judgement	A	Priority habitat directly impacted but mitigation feasible	Habitats within the site of WTW Option 2 and associated pipeline include hedgerows which are classified as priority habitats under the NERC Act (2006). No other habitats of significant biological importance will be lost as a result of construction of WTW Option 2.	Biodiversity and Nature Conservation
ENV9B	Minimise loss of aquatic priority habitats (use narrative to describe type and quantum)	Professional judgement based on knowledge of Water Framework Directive.	A	Priority habitat directly impacted but mitigation feasible	The pipeline associated with this option requires a crossing with the EWD at two separate locations. This means that the pipeline would need to be installed first to avoid disturbance but there is a potential for reduced habitat quality as the new EWD would largely need to be cut into fill (which would need to be a cohesive material) over the pipeline not in the existing ground profile as had been planned. There would need to be sufficient headroom between the bed of the channel and the soffit level of the pipe for this to work.	Aquatic Environment
ENV10A	Reduce effects on North Wessex Downs AONB and its setting	Professional judgement.	A	AONB and its setting likely to be affected. Effect is unlikely to be significant.	Introduction of water treatment works within the arable landscape would erode the setting of the North Wessex Downs National Landscape. However, intervisibility with North Wessex Downs National Landscape would be limited by the proposed reservoir embankment. The effect on the landscape character and tranquillity of the National Landscape and its setting would be unlikely to be significant due to the distance and opportunities to incorporate mitigation.	Landscape & Visual
ENV10B	Reduce effects on local landscape character	Professional judgement.	R	Effect on local landscape character is likely to be significant.	Introduction of water treatment works within the arable landscape would erode the local landscape character. Effect could potentially be significant locally, depending on design solution. Site clearance for the construction of the WTW and installation of pipelines would require the removal of existing hedgerows and trees which are largely limited to field boundaries. Easements around the pipelines could limit planting. Pipelines would be buried so on the whole only construction effects are relevant to landscape effects. With the exception of vegetation loss that cannot be replaced due to easements these effects would be temporary and therefore the location of the pipelines should not be a determining matter for the location of the WTW.	Landscape & Visual
ENV11A	Reduce effects on panoramic views from national trail, open access land and important viewpoints in AONB	Professional judgement.	A	Effect on panoramic views from national trail, open access land and important viewpoints in AONB unlikely to be significant.	Distant views are likely to be screened or partially screened by the reservoir embankment in panoramic view from the North Wessex Downs National Landscape including from The Ridgeway National Trail. Effect unlikely to be significant.	Landscape & Visual
ENV11B	Reduce effects on sensitive local visual receptors	Professional judgement.	R	Effect on local views of sensitive visual receptors likely to be significant.	Water treatment works likely to be visible from local PRoW and in open views from properties on north-western edge of Drayton, although vegetation along the A34 would provide screening for many properties further south-west in Drayton. Possible distant views from Corallian Limestone Ridge, including Oxford Green Belt Way. Effect on local views likely to be significant.	Landscape & Visual
ENV12	Minimise disturbance/encroachment into Air Quality Management Area (AQMA)	Based on an understanding of the scale and nature of activities, air quality management areas (AQMAs) were identified in close proximity to the proposed works.	G	Site is located further than 1km from AQMA OR no construction traffic must go through an AQMA	Marcham AQMA is the closest AQMA to Option 2 and is approximately 2.1km north-northwest of the indicative permanent WTW footprint at its closest point. The anticipated construction and operational activities would likely lead to a negligible change in air quality.	Air Quality
ENV13	Minimise disturbance/encroachment into Groundwater Source Protection Zone (SPZ)	Magic maps	G	Site is within Zone 3 or not within a SPZ	No Groundwater Source Protection Zones within the vicinity of the SESRO site.	Aquatic Environment
ENV14A	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Cow Common Brook and Portobello Ditch' WFD waterbody (GB106039023360) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	R	Major adverse impacts likely; high risk to ability to attain Water Framework Directive objectives for this waterbody	The siting of the WTW at Option 2 would have no impact on watercourses. However, there is a serious risk/implication of the associated pipeline route crosses the Eastern Watercourse Diversion at two separate locations. There is a risk to WFD compliance since the narrative used to date within the WFD assessment and the accompanying Applicability Assessment is that the new watercourses around the site will be excavated and then left to recover without further interference. Since the pipeline is assumed to be open cut and is to be placed underneath the EWD there is a risk in the programme since the pipeline would need to be installed first to ensure no disturbance to the EWD once excavated. There is already the potential for poorer habitat quality since the EWD would have to cut into fill over the pipeline but if the pipeline is not dug before the EWD then there is a risk of significant disturbance to the EWD unless the pipeline is tunnelled and not open cut.	Aquatic Environment
ENV14B	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ock and tributaries (Land Brook confluence to Thames)' WFD waterbody (GB106039023430) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14C	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Thames (Evenlode to Thame)' WFD waterbody (GB106039030334) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14D	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Sandford Brook (source to Ock)' WFD waterbody (GB106039023410) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14E	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Childrey Brook and Norbrook at Common' WFD waterbody (GB106039023380) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment

ENV14F	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ginge Brook and Mill Brook' WFD waterbody (GB106039023660) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14G	Option does not affect Water Framework Directive (WFD) Quality Elements within one of WFD waterbodies downstream of the River Thame to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives. These WFD waterbodies include: - Thames Wallingford to Caversham - WFD waterbody GB106039030331 - Thames (Reading to Cookham) - WFD waterbody GB106039023233 - Thames (Cookham to Egham) - WFD waterbody GB106039023231 - Thames (Egham to Teddington) - WFD waterbody GB106039023232	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on these waterbodies.	Aquatic Environment
ENV15A	Maximise potential for future environmental benefits (terrestrial), e.g. increase tree planting	Professional Judgement	R	Site allows only the minimum environmental benefits to be realised	No specific space for environmental benefits and removes areas of hedgerow habitat.	Biodiversity and Nature Conservation
ENV15B	Maximise potential for future environmental benefits (aquatic), e.g. increase wetlands area	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some additional environmental benefits to be realised	The siting of the WTW will not effect the delivery of environmental benefits. However, there is a serious risk that the associated pipeline reduces the habitat quality associated with the Eastern Watercourse Diversion as it will have to be sited on the same alignment of the pipeline for a significant length. To be possible a cohesive material would need to be installed on the pipeline and cut into to form the diversion.	Aquatic Environment
ENV16	Maximise flexibility in routing diverted watercourses so their habitats can be of sufficiently high quality to contribute to catchment Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some flexibility in routing watercourses / Good quality habitat options are available	The siting of the WTW will not affect the diverted watercourses. However, there is a serious risk that the associated pipeline reduces flexibility and habitat quality with the Eastern Watercourse Diversion as it will have to be sited along the same alignment of the pipeline for a significant length. To be possible, a cohesive material would need to be installed on the pipeline and cut into to form the diversion. This has the potential to reduce the overall habitat quality that can be delivered as a result.	Aquatic Environment
ENV17	Minimise disturbance/encroachment into Local Geological Sites (LGS)	Checking existing national and local records	G	Site is located more than 250m from LGS	No LGS present	Biodiversity and Nature Conservation
ENV18A	Minimise impacts associated with Noise and Vibration as a consequence of the construction of the option	Professional judgement informed by published guidance such as BS5228 and LA 111, and experience of relevant schemes, including the 300km Strategic Pipeline Alliance scheme. Assumed that well established generic mitigation measures will be put into place as required. Assumed that well established generic mitigation measures will be put into place as required. Indicative RAG assessment, with Red band being the distance from the works site to the SOAEL+5dB distance, and Amber is from SOAEL+5dB distance to the SOAEL. Construction of WTW: Red 69m, Amber 70-380m, Green 381m. Professional judgement used in assigning a single RAG rating for each option under review, which includes a review of the number of properties in each band and how close they are located to the RAG boundaries. Property counts do not consider screening of receptors by nearby buildings, screening at second row of properties by first row of properties. This will result in a precautionary assessment of noise impacts. NOTES: buildings to be demolished are excluded from assessment, RAG bands based on assessment approach for residential properties but all NV sensitive receptors identified at Gate 2 are included in analysis.	G	Impacts unlikely, or adverse impacts are likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW Option 2boundary ('Land to be assessed')): 565m - 26 Whitehorns Way, Drayton Numerous properties in Drayton ~600/700m 900m - Rushey & Marcham Mill, Mill Road [295m Vis.&Comm. Centre; 485m Cafe (to WTW footprint)] Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Advantages: Presence of A34 results in elevated prevailing background and ambient noise levels in Drayton Likelihood of significant adverse effects: Construction: Low. Although there is the potential for elevated noise levels above the SOAEL at a property in the vicinity of the pipeline, it is anticipated that open-cut trenching works would be restricted to daytime only works and would progress quickly, so wouldn't trigger the temporal element of the BS5228-1 noise criteria. It is also assumed that suitable noise mitigation would be adopted during pipe laying works when close to noise sensitive properties.	Noise
ENV18B	Minimise impacts associated with Noise and Vibration as a consequence of the operation of the option	Professional judgement informed by published guidance such as BS4142, BS8233 and the WHO Night Noise Guidelines for Europe and experience of relevant schemes including Frankley WTW extension and a UU WTW. Assumed that well established generic mitigation measures will be put into place as required. The assessment approach is as per that outlined above (ENV18A), but with the following RAG distances for operational noise impacts: Operation of WTW: Red 74m, Amber 75-400m, Green 401m.	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW Option 2boundary ('Land to be assessed')): 565m - 26 Whitehorns Way, Drayton Numerous properties in Drayton ~600/700m 900m - Rushey & Marcham Mill, Mill Road [295m Vis.&Comm. Centre; 485m Cafe (to WTW footprint)] Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Advantages: Presence of A34 results in elevated prevailing background and ambient noise levels in Drayton Likelihood of significant adverse effects: Operation: Low. Assumes no operational noise from proposed pipeline routes (Raw, Potable, Foul/Sludge & Contingency)	Noise
ENV19A	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the construction of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) and no statutory designated sites in the vicinity of Option 2. However, there is a residential property (Westbury House, Hanney Road), which is less than 50m from the associated pipeline (assuming open cut / cut & cover). It is considered that there are no proposed dust-generating construction activities that could not be managed using normal good practices (see IAQM construction dust guidance, 2024) to prevent significant effects at any "off-site" receptor.	Air Quality
ENV19B	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the operation of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) and no statutory designated sites in the vicinity of Option 2. During operation of the WTW, given the likely size / number of required diesel fuelled generator(s) and distance to the nearest sensitive receptors, the potential effects would likely lead to a negligible change in air quality.	Air Quality
ENV20A	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the construction of the option	Professional judgement.	A	Noticeable changes to visual amenity of local community	Noticeable change to visual amenity of local community in Drayton during construction, including due to lighting, would be limited to some extent due to presence of A34.	Landscape & Visual
ENV20B	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the operation of the option	Professional judgement.	G	Barely perceptible changes to visual amenities, with no or little effect on local community	Change to visual amenity of local community in Drayton during operation, including due to lighting, would be limited to some extent due to presence of A34 and could likely be mitigated long-term with sensitive design, earthworks and planting.	Landscape & Visual

ENV21A	Minimise impacts associated with solid discharge during construction.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV21B	Minimise impacts associated with solid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids unlikely	Pollution
ENV22A	Minimise impacts associated with liquid discharge during construction,.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV22B	Minimise impacts associated with liquid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Liquid discharge release should be prevented by appropriate site management.	Pollution
Community and Planning Considerations						
CPC1	Distance to the nearest property that will stay during construction (metres)	GIS	G	501m plus from the nearest property	The closest property to Option 2 is a property in Drayton Village, which is a distance of approx. 780m away. All other properties are >2,000m away from the Option 2.	Socio-Economic
CPC2	Minimise impacts on local community during construction associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during construction	The closest residential property to Option 2 as indicated by GIS layers on MOATA seems to be as small as 600m. This is on the border of a 500m buffer. Noise and Air Quality have indicated that there are no significant impacts expected so socio-economics will echo this.	Socio-Economic
CPC3	Minimise impacts on local community during operation associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during operation	The closest residential property to Option 2 as indicated by GIS layers on MOATA seems to be as small as 600m. This is on the border of a 500m buffer. Noise and Air Quality have indicated that there are no significant impacts expected so socio-economics will echo this. Similarly, the new buildings operating onsite (restaurant/cafe/education centre/community centre) will be in close proximity, Noise and Air Quality have not indicated significant effects therefore we cannot say if amenity would be affected for users.	Socio-Economic
CPC4A	Are public rights of way disrupted or adversely affected?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	G	No recreational resource / right of way are disrupted or affected. Sites with no recreational activities	WTW would not affect PRoW anymore than the reservoir construction would. PRoW are being reinstated around the WTW.	Socio-Economic
CPC4B	Are there opportunities to create or improve linkages of Public Rights of Way (PRoW) and recreational routes?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	A	Links to a recreational resource / right of way of local importance can be enhanced	PRoW are being reinstated around the WTW.	Socio-Economic
CPC5	Maximise potential opportunity for recreational benefits	GIS analysis of PRoW, open spaces, cycle routes, canals, other forms of regional/nationally important receptors (e.g. National Cycle Routes), and community assets.	R	Option allows only the minimum recreational benefits to be realised	The positioning of Option 2 is in full view of potential visitors to the reservoir and therefore could be disruptive to people's enjoyment of the new community assets being provided by the restaurant/community centre/education centre that are in close proximity. It could also dissuade visits to the sits.	Socio-Economic
CPC6	Support the realisation of socio-economic incentives on SESRO, including employment, skills, tourism, sustainable travel, connecting people with nature and environmental education	GIS analysis of footprint, community assets, private residents, and businesses. Also awareness of overall project objectives is needed to conclude if the designs align with these.	R	Site does not support the social-economic incentives of the overall scheme	The positioning of Option 2 is in full view of potential visitors to the reservoir and therefore could be disruptive to people's enjoyment of the new community assets being provided by the restaurant/community centre/education centre that are in close proximity. It could also dissuade visits to the sits.	Socio-Economic
CPC7	Minimise overall SESRO Order Limits extent and land acquisition, without compromising SESRO needs and project benefits	Spatial comparison of land that would likely be included in the DCO Order Limits, including construction working areas, access and highways or PRoW interactions.	G	Requires minimum Order Limits extent	The WTW option is within the area of land expected to be required for reservoir construction works and site extent (including landscaping) in operation, and within the area safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031, requiring the minimum Order Limits extent.	Consenting
CPC8	Aim for consistency with published and (insofar as possible) emerging Local Plan land use allocations	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in existing and any emerging Local Plan documents and any Supplementary Planning Documents.	G	Low or no impact	The WTW option is within the land safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031. The same remains true for the consultation draft Joint Local Plan 2041. No land use allocation conflicts with the Oxfordshire County Council Minerals and Waste Local Plans.	Consenting
CPC9	Aim for consistency with any adopted Neighbourhood Plan policy applicable to the land area affected	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in any made Neighbourhood Plan.	A	Negotiation required with Parish Council to accommodate scheme within Neighbourhood Plan	The WTW option is within the area of the made Drayton Neighbourhood Plan, which has a policy that development proposals are required to protect and enhance biodiversity (P-S1: Biodiversity).	Consenting
CPC10	Avoid development of infrastructure within specifically designated areas or their setting, as applicable (e.g. Green Belt, AONB, Common Land, Open Space)	Spatial comparison with designated sites, their settings, and the nature of development works expected.	G	Does not require development of above-ground infrastructure within these designations or development likely to have more than a negligible effect on the setting (where applicable)	Not located within a specifically designated area, such as Green Belt, AONB, Common Land or Open Space.	Consenting
CPC11	Avoid encroachment on any safeguarded land in minerals and waste policy, unless the minerals can be beneficially utilised as a result	Spatial comparison of allocated sites and review of policy wording in existing and any emerging Waste and Minerals Local Plan documents.	G	Low or no impact	Not located in minerals safeguarding area or on a site allocated for minerals or waste uses.	Consenting
CPC12	Ability to integrate with existing nationally-significant infrastructure, statutory undertakers' major infrastructure, or any proposed future Nationally Significant Infrastructure Projects (NSIP) (such as that of National Highways, Environment Agency, Network Rail)	Review of NSIP projects on PINS's register; review of Network Rail and National Highways investment plans; spatial review of statutory undertakers' assets.	G	Low or no interaction with existing infrastructure or proposed Nationally Significant Infrastructure Project (NSIP)	No NSIPs currently registered. No known proposals from Network Rail or National Highways.	Consenting

CPC13	Minimise the consenting complexity due to the need for additional consents and licenses that may be required outside the Development Consent Order (DCO), e.g. additional Flood Risk Activity Permit, Environmental Permit, abstraction/discharge Licence, European protected species licence, etc	Review of the nature of expected development works against the list of other consents and licenses developed at Gateway 2.	A	One or more additional consent/license required	The WTW option will require an Environmental Permit for the discharge of water into surface or groundwater. Option 2 will also require Land Drainage Consent for works in, over, under of affecting the flow of an ordinary watercourse and a standard or bespoke Flood Risk Activity Permit will also be required as the WTW is in Flood Zone 3.	Consenting
CPC14	Avoid or minimise the need for any consequential development consenting (i.e. displacement or alteration of other development)	Review of existing development within the likely land-take, its nature and scale.	G	No existing development requires planning permission to relocate or alter	There are no planning applications that would be impacted by the WTW or the pipeline. There are no major existing development in use either, rather the WTW and associated pipeline would be located on what is currently arable fields. Utility diversions are expected to be required, but this would likely be the case for SESRO works in this area, and would either form part of the DCO as associated development or potentially could be delivered through statutory undertaker permitted development.	Consenting
CPC15	Minimise interfaces/reliance on external governing/third parties (e.g. Removing the canal removes a stakeholder, reducing interfaces and permissions required from Network Rail, National Highways, National Grid)	Review GIS layers for services against the options. Expert Judgement.	R	Multiple complex interfaces with others may complicate or delay progress	Considering the WTW is planned on the SESRO project site and will be receiving raw water from the reservoir, it will be relying on the SESRO programme and its associated activities (most especially the recreational activates planned on the site). The location of Option 2 has a 132 kV high voltage overhead cable passing through the site. As part of the SESRO project, initial discussions regarding diversion of cables have been undertaken with the Distribution Network Operator (DNO), with detailed discussions intended as the designs and planning progress. At this stage, it is assumed that diversion of electric cables can be undertaken. Option 2 does not have any other utilities crossing the site. However, it will have major interfaces with the location having multiple activities and infrastructure including (but not limited to) potential public access carpark, multiple recreation buildings, proposed pumping station with major tunnelling activities planned in the area. There is a very strong possibility for collision between activities within this location.	Consenting
Property & Land Acquisition						
PRP1	Minimise loss of sensitive properties, i.e. residential, commercial, green belt, common land, historical or community assets due to project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of sensitive properties	Based on the information held at the moment, this option does not include the permanent or temporary loss of sensitive properties.	Property & Land Acquisition
PRP2	Minimise loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets due project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of allocated land for higher value or social value properties	Based on the information held at the moment, this option does not include the loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets.	Property & Land Acquisition
PRP3	Minimise permanent loss of best and most versatile agricultural land (grades 1, 2 and 3)	Review of agricultural grading layer on ArcGIS, based on 2019 Provisional Agricultural Land Classification	A	No Grade 1 or 2 agricultural land is affected and loss of <50% Grade 3 agricultural land	100% is Grade 3 land.	Property & Land Acquisition
PRP4	Assessment of Land and Property asset costs and associated compensation due under the Compensation Code	Review of land use / designation on ArcGIS	G	Land acquisition costs likely to be relatively low.	Based on the information held, the likely acquisition costs will be relatively low.	Property & Land Acquisition
PRP5	Assessment of special land considerations, including Special Category Land (SCL) and utility infrastructure, national asset protection agencies and Crown bodies	Review of affected landowners	G	Nature and / or extent Special Category Land is likely to cause low consenting risk	Based on the information held, there appears to be no Special Category Land.	Property & Land Acquisition
PRP6	Assessment of disruption to landowners' access to their land during construction and operation	Review location in conjunction with existing road network	G	Low disruption to landowners' access to their land during construction and operation	The construction of the reservoir will change the access routes in the area, and so it is assumed that construction of the water treatment works will not directly cause a problem with access to land in the area.	Property & Land Acquisition

C. WTW Placement Option 3 Criteria Workbook

Water Treatment Works - Option 3

Criteria code	Criteria Description	Method of Assessment	RAG	Description of RAG	Narrative	Sub-Theme
Constructability						
CON1	Safety - Risk of endangering construction workers or members of the public during construction e.g. water, ground, height, rail, road and utilities	Look at programme and list types of construction involved. Identify any that could potentially score red or amber. Sub-list of activities which would make it amber i.e. Tunnelling = Amber	A	Works can be constructed safely but enhanced control measures required	Important construction activities associated with the SESRO construction program need to be taken into account during the installation of the WTW and associated pipelines. Noteworthy considerations related to Option 3 with regards to laying of the associated pipework include the following: • Potable pipeline crossing with the Railway • Foul pipeline crossing A34. • Pipeline corridor housing the foul pipeline crosses the conveyance tunnel. • Pipeline corridor housing the raw, contingency and foul cross the EWD once. The foul pipe also crosses the EWD in an additional location. All these will require enhanced safety control measures. Further enhanced control measures are needed to account for the substantial earthworks associated with the SESRO construction, albeit these should be managed by the SESRO contractor. Also, Options 3 has an overhead high voltage cable crossing the site, overhead telecoms cables and buried high voltage cables, demanding additional safety considerations during construction. Additional complexities associated with Option 3 due to the tight working corridor in close proximity to the railway requiring enhanced safety control measures.	Health and Safety
CON2A	Programme - Duration, longest /shortest, but also consider whether the longer duration has an impact on the overall scheme programme	Compare differences in the programmes which would materialise from different options. Consider earthworks seasons.	A	Likely to extend the duration of the relevant area of works (e.g. road, rail siding or intake/offtake construction) compared to the Gate 2 SESRO programme but unlikely to impact on the critical path of the Gate 2 SESRO programme.	The program timescale may be influenced by several key factors, including pipework length, material transport, and SESRO compound activity. Due to the position of Option 3, which lies south of the reservoir, there is a greater need for longer pipelines for raw, contingency, and foul purposes. Even when accounting for the reduced length of potable pipework required, the overall increased length of pipework associated with Option 3 remains notable. Option 3 is situated away from the raw water pumping station (RWPS) (for raw and contingency connections) and the eastern SESRO border (for foul connection), although it is located near the southern SESRO border (for potable connection). It is important to acknowledge that the programme impact assessment has been conducted based on potential T2ST programme extensions. The installation of the T2ST WTW is not anticipated to affect the SESRO programme. The associated pipeline installations are likely to occur early in the SESRO programme, and they will be integrated in a manner that minimizes disruption and does not extend the SESRO programme duration. However, it is essential to note that an overall T2ST programme has not yet been finalized, and therefore, the full interactions with the T2ST programme have not been thoroughly assessed.	Programme
CON2C	Programme - Dependencies i.e. proximity or physical relationships between elements of scope that introduce programme dependencies	Is the options on the critical path? Will it impact other critical activities?	A	Several major dependencies/ multiple minor dependencies	Construction of the T2ST WTW alongside the SESRO reservoir introduces dependencies for all options. If the contractor for SESRO and T2ST (within the SESRO boundary) is the same, the risk associated with program disruption and dependencies is greatly reduced. T2ST construction is due to start in 2034, to be brought into service by 2040. SESRO construction is due to start in 2024, to be brought into service by 2040. The T2ST WTW pipeline corridors follow the access road around the reservoir, introducing a program dependency. Construction of the T2ST WTW is dependent on the completion of various access roads and construction compounds. The T2ST WTW is also dependent on the completion of the SESRO reservoir to enable operation of the works.	Programme
CON2D	Programme - Risk	Are there items in the construction which have a significant programme risk	R	Major programme risk	The risk associated with Option 3 is exacerbated due to the extended length of pipework required. Furthermore, there exists additional programmatic risk arising from the constricted working corridor situated between the embankment, road diversion, and railway line.	Programme
CON3A	Logistics - Space available for construction and materials storage	Determine space constraints using GIS and options layouts from option definition.	A	Limited / restricted space	In Option 3, the WTW site and construction compound fit within the designated area, but it's constrained. Limited space hinders material storage and compound expansion. Additionally, the construction corridor faces restrictions due to its proximity to the railway, embankment, road diversion, and woodland. Efficient planning would be crucial to navigate these challenges.	Logistics
CON3B	Logistics - Suitable and efficient access for construction workers, deliveries and waste removal including minimisation of lengths of new roads for access during construction	Determine method of access using GIS and options layouts from option definition.	A	Due to restricted access, an additional length of road is likely required for construction of the option.	Option 3 requires crossing the East Hanney road diversion during construction, which decreases efficiency compared to other options. Additionally, the access road for construction workers, deliveries, and waste removal totals approx. 8,100m from Marcham road roundabout (A415 to SESRO Access road). Notably, a significant portion of this road infrastructure is not entirely "new" to the WTW since it will also serve the construction needs of SESRO.	Logistics
CON3D	Logistics - Haulage distance required for construction materials arrival on site to the placement location	Determine length using GIS and options layouts from option definition.	R	For WTW: Large haulage distance required.	The distance from Marcham road roundabout (A415 to SESRO Access road) to Option 3 is approximately 8,100m. This is a large haulage distance.	Logistics
CON3E	Logistics - Vehicle movements	Use vehicle movement estimates to assess different options.	R	Construction works likely to require a large number of vehicle movements and vehicle movements may be difficult.	The main difference between sites with regards to the number of vehicle movements is the relative number of pipe lengths required to be transported to site. All other material transportation is similar for all sites. Option 3 has approx. 7,500m length of larger diameter pipes (potable/raw/emergency) and approx. 4,300m length of the smaller diameter pipes (foul). This is estimated as a total of 335 trips, which is a large number of vehicle/truck deliveries.	Logistics
CON4B	Construction Complexity - Location conflict/opportunity with another engineering component of the scheme or other SRO/non-SRO schemes, e.g. STT, T2ST, SWOX/Farmoor	Expert judgement and knowledge of surrounding schemes	G	Location / layout of option provides an opportunity to be developed along with another component of this scheme (or another scheme)	The site selection work is progressing on the assumption that the T2ST scheme will use the SESRO reservoir. The construction of the T2ST WTW within the SESRO boundary is an example of utilising opportunity to develop schemes alongside each other. Where possible, the road network within the SESRO boundary is being utilized for the T2ST pipeline corridors	Construction complexity
CON4C	Construction Complexity - Minimise the number and complexity of additional structures/assets required or modifications to the existing structures/assets in order to facilitate the option, e.g. bridges, culverts, crossings	Determine using GIS and options layouts from option definition.	A	Option requires a moderately complex (mitigation likely) and/or moderate number of additional structures and/or modification to existing structures.	Due to the constrained space between the reservoir outer embankment and the railway, a separate WTW layout has been developed at this location. The elongated layout may introduce a slightly tighter working compound. Additionally, the close proximity to the railway may result in limitations for plant activity, such as crane height issues. Existing foundations at this location would need to be entirely removed prior to construction, adding complexity to the option and removing benefit of re-use. This would occur regardless of the option being used for the WTW site, although should still be noted. All options require the potable main to cross under the railway.	Construction complexity
CON5A	3rd Party Impact - Potential to disrupt existing road network during enabling works and construction	Expert judgement	A	Disruption likely to be moderate	The construction access road requires a crossing with the East Hanney road diversion. This crossing point is unlikely to be shared with the rail siding. This crossing point will introduce moderate disruption on the existing road network. Note that the road diversion does not currently exist, although it will exist during the construction of the WTW. The potential disruption associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movement required for WTW and pipeline construction is expected to moderately impact the A34 and Marcham Road. Additionally, the option's position away from the pumping station will further increase the required vehicle movements, as previously covered in CON3E.	3rd Party Impact
CON5B	3rd Party Impact - Potential to disrupt existing rail network during enabling works and construction	Expert judgement	A	Disruption likely to be moderate	There is a potential for disruption of the rail network associated with Option 3. This is due to the close proximity of the railway line to the WTW. If proper engineering practices are adhered to, the risk of disturbances should be designed out at planning stages. A worst case scenerio is currently assumed, whereby no construction materials will be delivered via the rail siding.	3rd Party Impact
CON7A	Ground - Terrain of site, and implications for the need for earthworks and engineered slopes	Use of lidar and civil 3D models to assess amount/location of earthworks required	G	Terrain is favourable to the design of assets and therefore reduces the amount of earthworks required	Generally, it is assumed that the WTW will be built at ground level (i.e., no deep excavations, using shallow foundations). Rough estimates using the Lidar data and assuming the site will be levelled for construction purposes (using the lowest point within the site boundary as reference base layer) show that Option 3 will require approx. 54,000 m3 of earthworks. Also, Option 3 is in a location that will be shielded by the embankment of the reservoir and will require very limited earthworks for landscaping and hiding the WTW from view.	Construction complexity
CON7C	Ground - Impact of ground conditions on the complexity of design and construction	Use of expert judgement	A	Ground conditions may impact the complexity of design and construction to a limited extent resulting in, for example, increased costs and a requirement for materials that are difficult to source.	The land associated with this option is situated on the base of a former Ministry of Defence site. Additionally, there is evidence of a former sewage treatment facility in this location. There is a risk that the land may be contaminated. The geology of the options varies due to the regional dip. In the south-east of the SESRO site, there are layers of Gaulty Clay, Lower Greensand, Kimmeridge Clay, and Corallian. Conversely, the north-west portion of the site contains only the latter two layers. Despite the geological differences, it is not expected to significantly impact construction	Construction complexity

CON7E	Construction Complexity - Complexity of pipeline installation within corridors	Expert judgement	A	The pipeline route faces several challenges that increase its complexity and risk. These include passage through congested pinch points, risk of ground settlement, and/or obstacle avoidance	All options require the potable pipeline to cross the railway on the south of the reservoir and the foul pipework under the A34. Option 3's pipeline corridor demands that the raw, contingency, and foul pipework follow the same route for approx. 3700m. This introduces additional complexities due to the pipeline corridor width required to accommodate three pipework sections. Few more pinch points with the pipeline laying: • Pipeline corridor housing the foul pipeline crosses the conveyance tunnel. • Pipeline corridor housing the raw, contingency and foul cross the EWD once. The foul pipe also crosses the EWD in an additional location. Also, Options 3 has an overhead high voltage cable crossing the site, overhead telecoms cables and buried high voltage cables, introducing more construction complexities. Additionally, Option 3 has approximately 11,800m overall pipework length, adding to its complexity.	Construction complexity
Operability						
OPS1B	Safety - Access and egress for operational staff, visitors, deliveries and waste removal during normal operations and emergencies	Expert judgement	A	Access/egress can be provided, however it is challenging / restricted	During typical operations, access restrictions in Option 3 are minimal, however, to accommodate for future WTW repairs and upgrades, there will be restrictions and challenges for required construction activities. For emergency situations, major emergency services (Hospital, Police, Fire station) have good access to A415 and can easily reach site via the available and proposed routes. However, Option 3, while being close to a major road, is approximately 10km away from the three main emergency services in Abingdon used as reference. Also, accessing Option 3 will necessitate using the Hanney Steventon Road Diversion, which entails passing through one of the respective villages, constituting a restriction to access and egress.	Health and Safety
OPS4C	Reliability - Impact of WTW location on gravity discharge of excess water e.g. overflows and contingency / commissioning discharges	Expert judgement	A	Pumping is required potentially introducing a single point of failure but mitigation measures can be introduced to avoid interruption to supply.	Contingency - In the worst-case scenario, the static head to overcome in the wet well is 55m. Option 3 includes 3,700m of contingency pipework. The ground level of Option 3 at its lowest point is 65.2m. This equates to a gradient of ~1 in 370. There is the potential to facilitate gravity transfer of contingency flows for this option. Foul - Foul waste for all options will need to be pumped to Abington STW. Sludge generated during the water treatment process will be transferred via the foul pipe. Currently, it remains undecided whether the foul pipe serving the T2ST WTW will be shared with SESRO recreational facilities.	Operational Resilience
OPS5B	Adaptability - Flexibility for future modifications e.g. increasing reservoir storage volume, rail station at wantage and grove, construction of Marcham Bypass	Expert judgement	R	Option includes no flexibility for future modifications	Option 3 has an area of approximately 0.14km2, which leaves about 0.06km2 for future expansion / modifications to the WTW. However, due to the proximity of other structures and activities in this location, there is no flexibility for future modifications.	Operational Resilience
OPS7A	Sustainability - Reuse of assets or temporary works for permanent items, e.g. materials storage slab, haulage roads, compound car park	Expert judgement	R	N/A - Options should not be scored red if they cannot use existing assets	Option 3 entails establishing a new WTW and presents limited potential for asset reuse or temporary works. The existing foundations linked to the historic MOD storage facility cannot be preserved. Full removal is necessary before installing the WTWs.	Operational Resilience
OPS8A	3rd Party Impact - Potential to disrupt existing road network during operation	Expert judgement	G	No disruption likely / possibility of enhancement	During typical operation of the WTW there is expected to be limited influence on the current road network. Operational chemical deliveries are projected to involve around 4 tankers per week. However, accessing Option 3 will necessitate using the Hanney Steventon Road Diversion, which entails passing through one of the respective villages. While the road diversion is not currently operational, the WTW will be constructed after the road. Therefore, the road is included in the 'current' road network impact assessment A more significant impact associated with Option 3, following construction, pertains to future repairs and upgrades. Although this falls outside typical operations, post-construction maintenance will be necessary. This will introduce implications for West Hanney and/or Steventon.	Transport Planning
Relative Costs						
COS1	Capex cost of the option	Cost estimate calculation for each option.	A	CAPEX estimated to be 2% to 10% of the estimated Gate 2 CAPEX for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major cost differentiator will be the cost of the pipelines (to and from the site). Option 3 costs approximately 5% of the estimated Gate 2 (November 2022) Capex for the overall T2ST project.	Cost
Carbon Costs						
CAR1	Carbon emissions associated to the Capex of the option	Carbon estimate calculation for each option.	A	Emissions (tCO2e) estimated to be 2% to 10% of the estimated Gate 2 emissions (tCO2e) for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major cost differentiator will be the carbon associated with the pipelines (to and from the site). Option 3 accounts for approximately 3% of the estimated Gate 2 (November 2022) Capex Carbon emissions for the overall T2ST project.	Carbon
CAR3	Opportunity for mitigation e.g. smaller earthworks may lead to less carbon	Carbon estimate calculation for each option.	A	Limited likelihood and magnitude of mitigation opportunity.	Option 3 is in a location that will be partially shielded by the embankment of the reservoir. However, WTW will still be visible to the public and will require earthworks for landscaping and hiding the site from view, which has significant carbon emissions associated.	Carbon
Environmental Performance						
ENV1A	Minimise impacts on Special Area of Conservation	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no SAC's or potential SAC's within the boundary of the proposed Option 3 WTW. The closest SAC to the proposed WTW is 4.3km to the north (Cothill Fen SAC).	Biodiversity and Nature Conservation
ENV1B	Minimise impacts on Special Protection Area	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no SPA's or potential SPA's within the boundary of the proposed WTW Option 3. The closest SPA to the WTW is Thames Basin Heaths SPA located 40.5km to the south-east.	Biodiversity and Nature Conservation
ENV1C	Minimise impacts on Ramsar	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Ramsar sites or potential Ramsar sites within the boundary of the proposed WTW Option 3. The closest Ramsar to the WTW is South-west London Waterbodies located 56.5km to the south-east.	Biodiversity and Nature Conservation
ENV1D	Minimise impacts on Site of Special Scientific Interest	Professional Judgement and use of MAGIC maps.	A	Construction area or access road located within statutory sites; mitigation may be required but option still feasible OR designated site indirectly impacted but mitigation likely to be effective	There are no SSSI's within the boundary of the proposed WTW Option 3. The closest SSSI to the WTW is Barrow Farm Fens SSSI located 2.6km to the north. The proposed WTW location is located within the SSSI Impact Risk Zone (IRZ) for Frilford Heath, Ponds and Fens SSSI and Barrow Farm Fen SSSI. There is potential for impact on the SSSI's through air pollution including industrial processes, slurry lagoons and combustion processes from industry.	Biodiversity and Nature Conservation
ENV1E	Minimise impacts on National Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no NNR within the boundary of the proposed WTW Option 3. The closest NNR to the WTW is located 4.8km to the north. Cothill NNR.	Biodiversity and Nature Conservation
ENV1F	Minimise impacts on Local Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no LNR within the boundary of the proposed WTW Option 3. The closest LNR to the WTW is located 5km to the north-east of the site. The site is called Abbey Fishponds LNR.	Biodiversity and Nature Conservation
ENV2A	Minimise impacts on Ancient Woodland	Natural England Ancient Woodland Maps and Professional Judgement.	G	No ancient woodland impacted	Historic mapping indicates that there is no ancient woodland present on-site	Biodiversity and Nature Conservation

ENV2B	Minimise impacts on Ancient and Veteran Trees	Woodland Trust Ancient Tree Inventory map search and professional judgement	A	Development in close proximity with potential indirect impact to ancient or veteran trees	There are no ancient or veteran trees recorded by the Woodland Trusts Ancient Tree Inventory on or close to this option. However, survey may identify trees that could be classified as ancient or veteran. As such, this option scores amber on a precautionary basis pending survey.	Biodiversity and Nature Conservation
ENV2C	Minimise impacts on Protected Trees	Check against published TPO dataset.	G	No protected trees impacted	No protected trees would be impacted.	Landscape & Visual
ENV2D	Minimise impacts on vegetation (including trees, woodland, hedges and shrubs)	Check against baseline resources and based upon high level knowledge of site from previous site visits. Professional judgement.	R	Direct impact on vegetation within large proportion of construction footprint, which is of high arboricultural/amenity value (e.g. A or B grade) or biodiversity habitat in good condition.	Construction of WTW Option 3 and associated pipelines will require the removal of hedgerow, scrub and broadleaved woodland habitat. This is assumed to be likely to include A or B grade trees.	Biodiversity and Nature Conservation and Landscape
ENV3	Minimise impacts on Local Wildlife Sites (LWS)	Professional Judgement and LWS Citation provided by TVERC.	A	LWS are impacted but mitigation is feasible	There are no LWS located within the boundary of the WTW Option 3. However, the WTW is located only 50m to the east of The Cuttings and Hutchins Copse LWS. Although construction of the WTW would have no direct impacts on the LWS there could be a disturbance impact on any protected and notable species present through noise and dust.	Biodiversity and Nature Conservation
ENV4A	Minimise impacts on Scheduled monuments or activities which could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The nearest Scheduled Monument to the option location is 4.25km east at a settlement Option 3 east of Milton.	Historic Environment
ENV4B	Minimise impacts on listed buildings or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The nearest Listed Building to the option is 1.3km to the east in Steventon. Changes to setting will not occur at this distance.	Historic Environment
ENV4C	Minimise impacts on Registered Parks and Garden or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	Sutton Courtenay Manor lies 5.45km to the north east of the option and will not experience any change to its setting.	Historic Environment
ENV4D	Minimise impacts on Registered Battlefields or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Vattle of Chalgrove Registered Battlefield lies 21km north east of the option.	Historic Environment
ENV4E	Avoid impacts on World Heritage Sites or activities that could lead to a loss of significance, including setting	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	Blenheim Palace World Heritage Site lies 23km to the north of the option and will not experience any change to its setting.	Historic Environment
ENV4F	Minimise impacts on conservation areas which could result in loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Conservation Area of Steventon lies 1.2km east of the option and would not experience any changes to setting .	Historic Environment
ENV5A	Minimise loss to non-designated built heritage	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Extensive loss of non-designated built heritage of low value within the permanent infrastructure zone and adverse changes to within a 500m area from the edges of the permanent infrastructure OR more limited effects on non-designated built heritage of medium value	The option occupies the southern extent of an industrial estate which features buildings from the mid-20th century.	Historic Environment
ENV5B	Minimise loss to paleoenvironmental remains	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	G	Extensive scale of loss or damage to low value remains within the construction area and adverse changes to similar buried remains in a 1km area around the permanent infrastructure from temporary and permanent changes to local hydrogeological regimes OR more limited effects on remains of medium value	The paleoenvironmental resource at this location is unknown in terms of presence and significance. A medium value is assumed for optioneering reasons.	Historic Environment
ENV5C	Minimise loss to non-designated historic landscapes	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	G	Extensive scale of loss or extensive changes to low value non-designated historic landscapes within the construction area and extensive changes to the setting of the same resource outside the permanent infrastructure OR more limited effects on non-designated historic landscapes of medium value	No such assets present within the HER dataset or obvious from aerial images.	Historic Environment
ENV5D	Minimise loss of non-designated archaeological remains	Professional judgement, incorporating the use of the IEMA's Principles of Cultural Heritage Assessment in the UK and the Chartered Institute for Archaeologists standard and guidance document for desk based assessment	R	Permanent infrastructure and construction area will result in extensive loss and / permanent damage to non-designated buried and extant archaeological remains worthy of national significance which can't be adequately mitigated through preservation by record	The option would overlap with two concentrations of high value non-designated archaeology. Any potential impacts to buried archaeological remains can be mitigated, but would be costly.	Historic Environment
ENV6C	Minimise impacts of groundwater flood risk.	Checking existing national and local records	G	No predicted impacts on groundwater flood risk	Design groundwater level is generally uniform across the site (currently taken as GL-1m). There is no additional information that specifies that there is a difference between the different sites.	Flood risk
ENV7A	Minimise disturbance of potentially contaminated land	Checking existing national and local records	A	Disturbance of potentially contaminated land with one or more of the following properties: - Unlikely to have significant / showstopping cost or program implications - Unlikely to cause significant harm to potential receptors - Can be easily mitigated and remediated	Option is located on the site of Steventon Depot, a historical military depot dating from WW2 in use today for commercial purposes. A small sewage treatment works associated with the depot was located here historically, it is no longer present. Additionally this option is located adjacent to the historical railway line which is currently active. Option located largely on non-agricultural land, with some Grade 3a BMV agricultural soil (2008 detailed survey).	Land Quality
ENV7B	Minimise disturbance of potentially contaminated land specifically in relation to authorised and historic landfills	Checking existing national and local records	G	Not within authorised and historic landfills or previous industrial sites or within 250m of authorised and historic landfills or previous industrial sites	No landfills known to be located within 250m	Land Quality
ENV8	Minimise disturbance of land with known potential for Unexploded Ordnance (UXO)	Checking existing national and local records	G	No disturbance of land contaminated by UXO	Low risk UXO area (Zetica)	Land Quality
ENV9A	Minimise loss of terrestrial priority habitats (use narrative to describe type and quantum)	Use of aerial imagery, MAGIC maps and Professional Judgement	A	Priority habitat directly impacted but mitigation feasible	Habitats within the site of the WTW Option 3 and associated pipeline include those which are classified as priority habitats under the NERC Act (2006). Priority habitats likely to be present hedgerows, lowland mixed deciduous woodland, ponds and arable field margins.	Biodiversity and Nature Conservation

ENV9B	Minimise loss of aquatic priority habitats (use narrative to describe type and quantum)	Professional judgement based on knowledge of Water Framework Directive.	A	Priority habitat directly impacted but mitigation feasible	The pipeline associated with this option requires a crossing with the EWD at two separate locations. This means that the pipeline would need to be installed first to avoid disturbance but there is a potential for reduced habitat quality as the new EWD would largely need to be cut into fill (which would need to be a cohesive material) over the pipeline not in the existing ground profile as had been planned. There would need to be sufficient headroom between the bed of the channel and the soffit level of the pipe for this to work.	Aquatic Environment
ENV10A	Reduce effects on North Wessex Downs AONB and its setting	Professional judgement.	R	AONB and its setting likely to be affected. Effect is likely to be significant.	Introduction of water treatment works within the landscape would lead to loss of woodland along the GWR Main Line and erode a key characteristic which currently contributes positively to the local landscape character and setting of the North Wessex Downs National Landscape. Closest option and likely intervisibility with North Wessex Downs National Landscape. The effect on the landscape character and tranquillity of the National Landscape and its setting could potentially be significant depending on the design solution.	Landscape & Visual
ENV10B	Reduce effects on local landscape character	Professional judgement.	A	Effect on local landscape character is unlikely to be significant.	Introduction of water treatment works would lead to loss of woodland that currently contributes positively to local landscape character. This would erode the local landscape character, although existing landscape character is partially industrial and the WTW would partly replace part of the existing Steventon Depot. Effect on local landscape character therefore unlikely to be significant in this context. Site clearance for installation of pipelines would require the removal of existing hedgerows and trees which are largely limited to field boundaries. Easements around the pipelines could limit planting. Pipelines would be buried so, on the whole, only construction effects are relevant to landscape effects. With the exception of vegetation loss that cannot be replaced due to easements these effects would be temporary and therefore the location of the pipelines should not be a determining matter for the location of the WTW.	Landscape & Visual
ENV11A	Reduce effects on panoramic views from national trail, open access land and important viewpoints in AONB	Professional judgement.	R	Effect on panoramic views from national trail, open access land and important viewpoints in AONB likely to be significant.	Water treatment works likely visible in panoramic views from the North Wessex Downs National Landscape including The Ridgeway National Trail, although would potentially be seen against the backdrop of the proposed reservoir embankment. Effect could potentially be significant depending on the design solution.	Landscape & Visual
ENV11B	Reduce effects on sensitive local visual receptors	Professional judgement.	A	Effect on local views of sensitive visual receptors unlikely to be significant.	Water treatment works possibly visible in distant filtered views through existing vegetation from the western edge of Steventon. Effects unlikely to be significant.	Landscape & Visual
ENV12	Minimise disturbance/encroachment into Air Quality Management Area (AQMA)	Based on an understanding of the scale and nature of activities, air quality management areas (AQMAs) were identified in close proximity to the proposed works.	G	Site is located further than 1km from AQMA OR no construction traffic must go through an AQMA	Marcham AQMA is the closest AQMA to Option 3 and is approximately 4.7 km north of the indicative permanent WTW footprint at its closest point. The anticipated construction and operational activities would likely lead to a negligible change in air quality.	Air Quality
ENV13	Minimise disturbance/encroachment into Groundwater Source Protection Zone (SPZ)	Magic maps	G	Site is within Zone 3 or not within a SPZ	No Groundwater Source Protection Zones within the vicinity of the SESRO site.	Aquatic Environment
ENV14A	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Cow Common Brook and Portobello Ditch' WFD waterbody (GB106039023360) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	R	Major adverse impacts likely; high risk to ability to attain Water Framework Directive objectives for this waterbody	The siting of the WTW at Option 3 would have a minor impact on one small watercourse which could be mitigated for. The pipeline associated with this option requires a crossing with the EWD at two separate locations. There is a risk to WFD compliance since the narrative used to date within the WFD assessment and the accompanying Applicability Assessment is that the new watercourses around the site will be excavated and then left to recover without further interference. Since the pipeline is assumed to be open cut and is to be placed underneath the EWD there is a risk in the programme since the pipeline would need to be installed first to ensure no disturbance to the EWD once excavated. There is already the potential for poorer habitat quality since the EWD would have to cut into fill over the pipeline but if the pipeline is not dug before the EWD then there is a risk of significant disturbance to the EWD unless the pipeline is tunnelled and not open cut.	Aquatic Environment
ENV14B	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ock and tributaries (Land Brook confluence to Thames)' WFD waterbody (GB106039023430) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14C	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Thames (Evenlode to Thame)' WFD waterbody (GB106039030334) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14D	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Sandford Brook (source to Ock)' WFD waterbody (GB106039023410) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14E	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Childrey Brook and Norbrook at Common' WFD waterbody (GB106039023380) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14F	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ginge Brook and Mill Brook' WFD waterbody (GB106039023660) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14G	Option does not affect Water Framework Directive (WFD) Quality Elements within one of WFD waterbodies downstream of the River Thame to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives. These WFD waterbodies include: - Thames Wallingford to Caversham - WFD waterbody GB106039030331 - Thames (Reading to Cookham) - WFD waterbody GB106039023233 - Thames (Cookham to Egham) - WFD waterbody GB106039023231 - Thames (Egham to Teddington) - WFD waterbody GB106039023232	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV15A	Maximise potential for future environmental benefits (terrestrial), e.g. increase tree planting	Professional Judgement	R	Site allows only the minimum environmental benefits to be realised	No specific space for environmental benefits and removes areas of woodland, scrub, pond and hedgerow habitat.	Biodiversity and Nature Conservation

ENV15B	Maximise potential for future environmental benefits (aquatic), e.g. increase wetlands area	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some additional environmental benefits to be realised	The siting of the WTW will not effect the delivery of environmental benefits. However, there is a serious risk that the associated pipeline reduces the habitat quality associated with the Eastern Watercourse Diversion as it will have to be sited on the same alignment of the pipeline for a significant length. To be possible, a cohesive material would need to be installed on the pipeline and cut into to form the diversion.	Aquatic Environment
ENV16	Maximise flexibility in routing diverted watercourses so their habitats can be of sufficiently high quality to contribute to catchment Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some flexibility in routing watercourses / Good quality habitat options are available	The siting of the WTW will not affect the diverted watercourses. However, there is a serious risk that the associated pipeline reduces flexibility and habitat quality with the Eastern Watercourse Diversion as it will have to be sited along the same alignment of the pipeline for a significant length. To be possible, a cohesive material would need to be installed on the pipeline and cut into to form the diversion. This has the potential to reduce the overall habitat quality that can be delivered as a result.	Aquatic Environment
ENV17	Minimise disturbance/encroachment into Local Geological Sites (LGS)	Checking existing national and local records	G	Site is located more than 250m from LGS	No LGS present	Biodiversity and Nature Conservation
ENV18A	Minimise impacts associated with Noise and Vibration as a consequence of the construction of the option	Professional judgement informed by published guidance such as BS5228 and LA 111, and experience of relevant schemes, including the 300km Strategic Pipeline Alliance scheme. Assumed that well established generic mitigation measures will be put into place as required. Assumed that well established generic mitigation measures will be put into place as required. Indicative RAG assessment, with Red band being the distance from the works site to the SOAEL+5dB distance, and Amber is from SOAEL+5dB distance to the SOAEL. Construction of WTW: Red 69m, Amber 70-380m, Green 381m. Professional judgement used in assigning a single RAG rating for each option under review, which includes a review of the number of properties in each band and how close they are located to the RAG boundaries. Property counts do not consider screening of receptors by nearby buildings, screening at second row of properties by first row of properties. This will result in a precautionary assessment of noise impacts. NOTES: buildings to be demolished are excluded from assessment, RAG bands based on assessment approach for residential properties but all NV sensitive receptors identified at Gate 2 are included in analysis.	G	Impacts unlikely, or adverse impacts are likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW site boundary ('Land to be assessed')): 770m - The Picked Mead, Hanney Road* ~10/15 noise sensitive receptors on Hanney Road* 1180m - 21 Vicarage Road, Steventon Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Advantages: Rail line will increase ambient noise levels in Steventon Likelihood of significant adverse effects: Construction: Low. Although there is the potential for elevated noise levels above the SOAEL at a property in the vicinity of the pipeline, it is anticipated that open-cut trenching works would be restricted to daytime only works and would progress quickly, so wouldn't trigger the temporal element of the BS5228-1 noise criteria. It is also assumed that suitable noise mitigation would be adopted during pipe laying works when close to noise sensitive properties. * properties to be demolished	Noise
ENV18B	Minimise impacts associated with Noise and Vibration as a consequence of the operation of the option	Professional judgement informed by published guidance such as BS4142, BS8233 and the WHO Night Noise Guidelines for Europe and experience of relevant schemes including Frankley WTW extension and a UU WTW. Assumed that well established generic mitigation measures will be put into place as required. The assessment approach is as per that outlined above (ENV18A), but with the following RAG distances for operational noise impacts: Operation of WTW: Red 74m, Amber 75-400m, Green 401m.	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW site boundary ('Land to be assessed')): 770m - The Picked Mead, Hanney Road* ~10/15 noise sen. receptors on Hanney Road* 1180m - 21 Vicarage Rd, Steventon Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Advantages: Rail line will increase ambient noise levels in Steventon Likelihood of significant adverse effects: Operation: Low. Assumes no operational noise from proposed pipeline routes (Raw, Potable, Foul/Sludge & Contingency). * properties to be demolished	Noise
ENV19A	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the construction of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) in the vicinity of Option 3. However, there is a residential property (Westbury House, Hanney Road), which is less than 50m from the associated pipeline (assuming open cut / cut & cover). Cuttings and Hutchins Copse LWS is approximately 30 m from the WTW Option 3 land to be assessed. It is considered that there are no proposed dust-generating construction activities that could not be managed using normal good practices (see IAQM construction dust guidance, 2024) to prevent significant effects at any "off-site" receptor.	Air Quality
ENV19B	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the operation of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) in the vicinity of Option 3. During operation of the WTW, given the likely size / number of required diesel fuelled generator(s) and distance to the nearest sensitive receptors, the potential effects would likely lead to a negligible change in air quality. At the Cuttings and Hutchins Copse LWS, the impact is likely to be not significant.	Air Quality
ENV20A	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the construction of the option	Professional judgement.	G	Barely perceptible changes to visual amenity, with no or little effect on local community	Change to visual amenity of community in Steventon during construction, including due to lighting, would be limited due to the distance.	Landscape & Visual
ENV20B	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the operation of the option	Professional judgement.	G	Barely perceptible changes to visual amenities, with no or little effect on local community	Change to visual amenity of community in Steventon during operation, including due to lighting, would be limited due to the distance.	Landscape & Visual
ENV21A	Minimise impacts associated with solid discharge during construction.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV21B	Minimise impacts associated with solid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids unlikely	Pollution
ENV22A	Minimise impacts associated with liquid discharge during construction,.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV22B	Minimise impacts associated with liquid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Liquid discharge release should be prevented by appropriate site management.	Pollution
Community and Planning Considerations						
CPC1	Distance to the nearest property that will stay during construction (metres)	GIS	G	501m plus from the nearest property	The closest property to Option 3 is a property in Steventon Village, which is a distance of approx. 1,500m away. All other properties are >3,400m away from the Option 3.	Socio-Economic
CPC2	Minimise impacts on local community during construction associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during construction	No impacts during construction.	Socio-Economic
CPC3	Minimise impacts on local community during operation associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during operation	No impacts during operation.	Socio-Economic
CPC4A	Are public rights of way disrupted or adversely affected?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	G	No recreational resource / right of way are disrupted or affected. Sites with no recreational activities	WTW would not affect PRoW anymore than the reservoir construction would. PRoW are being reinstated around the WTW.	Socio-Economic
CPC4B	Are there opportunities to create or improve linkages of Public Rights of Way (PRoW) and recreational routes?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	A	Links to a recreational resource / right of way of local importance can be enhanced	PRoW are being reinstated around the WTW.	Socio-Economic

CPC5	Maximise potential opportunity for recreational benefits	GIS analysis of PRoW, open spaces, cycle routes, canals, other forms of regional/nationally important receptors (e.g. National Cycle Routes), and community assets.	A	Option allows some additional recreational benefits to be realised	WTW positioning avoids dissuading visitors to the reservoir.	Socio-Economic
CPC6	Support the realisation of socio-economic incentives on SESRO, including employment, skills, tourism, sustainable travel, connecting people with nature and environmental education	GIS analysis of footprint, community assets, private residents, and businesses. Also awareness of overall project objectives is needed to conclude if the designs align with these.	G	Site supports the social-economic incentives of the overall scheme	WTW positioning avoids dissuading visitors to the reservoir.	Socio-Economic
CPC7	Minimise overall SESRO Order Limits extent and land acquisition, without compromising SESRO needs and project benefits	Spatial comparison of land that would likely be included in the DCO Order Limits, including construction working areas, access and highways or PRoW interactions.	A	Requires minor additional Order Limits extent	The WTW option is within the area of land expected to be required for reservoir and road diversion construction works, but may lie outside the likely Option 3xtent (including landscaping) without the WTW in operation. It is within the area safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031. If included within the Order Limits for the SESRO application, it may require slightly greater Order Limits extent.	Consenting
CPC8	Aim for consistency with published and (insofar as possible) emerging Local Plan land use allocations	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in existing and any emerging Local Plan documents and any Supplementary Planning Documents.	G	Low or no impact	The WTW option is within the land safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031. The same remains true for the consultation draft Joint Local Plan 2041. No land use allocation conflicts with the Oxfordshire County Council Minerals and Waste Local Plans.	Consenting
CPC9	Aim for consistency with any adopted Neighbourhood Plan policy applicable to the land area affected	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in any made Neighbourhood Plan.	G	Low or no impact	The WTW is located within the Steventon Neighbourhood Plan area, which is preparing for examination. There are no conflicting policies within the NP.	Consenting
CPC10	Avoid development of infrastructure within specifically designated areas or their setting, as applicable (e.g. Green Belt, AONB, Common Land, Open Space)	Spatial comparison with designated sites, their settings, and the nature of development works expected.	G	Does not require development of above-ground infrastructure within these designations or development likely to have more than a negligible effect on the setting (where applicable)	Not located within a specifically designated area, such as Green Belt, AONB, Common Land or Open Space.	Consenting
CPC11	Avoid encroachment on any safeguarded land in minerals and waste policy, unless the minerals can be beneficially utilised as a result	Spatial comparison of allocated sites and review of policy wording in existing and any emerging Waste and Minerals Local Plan documents.	G	Low or no impact	Not located in minerals safeguarding area or on a site allocated for minerals or waste uses.	Consenting
CPC12	Ability to integrate with existing nationally-significant infrastructure, statutory undertakers' major infrastructure, or any proposed future Nationally Significant Infrastructure Projects (NSIP) (such as that of National Highways, Environment Agency, Network Rail)	Review of NSIP projects on PINS's register; review of Network Rail and National Highways investment plans; spatial review of statutory undertakers' assets.	G	Low or no interaction with existing infrastructure or proposed Nationally Significant Infrastructure Project (NSIP)	No NSIPs currently registered. No known proposals from Network Rail or National Highways.	Consenting
CPC13	Minimise the consenting complexity due to the need for additional consents and licenses that may be required outside the Development Consent Order (DCO), e.g. additional Flood Risk Activity Permit, Environmental Permit, abstraction/discharge Licence, European protected species licence, etc	Review of the nature of expected development works against the list of other consents and licenses developed at Gateway 2.	A	One or more additional consent/license required	The WTW option will require an Environmental Permit for the discharge of water into surface or groundwater. Option 3 will likely also require a Basic Asset Protection Agreement (BAPA) for works affecting Network Rail Land (within 15m).	Consenting
CPC14	Avoid or minimise the need for any consequential development consenting (i.e. displacement or alteration of other development)	Review of existing development within the likely land-take, its nature and scale.	A	Other existing development requires planning permission to relocate or alter	There are no planning applications that would be impacted by the WTW or the pipeline. The WTW would be located on what is currently Steventon Depot storage facility. However, this facility is also expected to be impacted by other reservoir construction and road diversion works.	Consenting
CPC15	Minimise interfaces/reliance on external governing/third parties (e.g. Removing the canal removes a stakeholder, reducing interfaces and permissions required from Network Rail, National Highways, National Grid)	Review GIS layers for services against the options. Expert Judgement.	A	Several manageable interfaces with others	Considering the WTW is planned on the SESRO project site and will be receiving raw water from the reservoir, it will be relying on the SESRO programme and its associated activities (most especially the recreational activates planned on the site). The location of Option 3 has a 33 kV high voltage overhead cable and an 11 kV underground cable passing through the site. As part of the SESRO project, initial discussions regarding diversion of cables have been undertaken with the Distribution Network Operator (DNO), with detailed discussions intended as the designs and planning progress. At this stage, it is assumed that diversion of electric cables can be undertaken. There is also an overhead telecommunication cable at the north of the Option 3 site. Of major significance is the proximity of Option 3 to the railway line (<100m away), presenting a potential for disruption of the rail network requiring interactions/ reliance and or agreement with Network rails if work poses any interruptions. However, if proper engineering practices are adhered to, the risk of disturbances should be designed out at planning stages.	Consenting
Property & Land Acquisition						
PRP1	Minimise loss of sensitive properties, i.e. residential, commercial, green belt, common land, historical or community assets due to project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of sensitive properties	Based on the information held at the moment, this option does not include the permanent or temporary loss of sensitive properties.	Property & Land Acquisition
PRP2	Minimise loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets due project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of allocated land for higher value or social value properties	Based on the information held at the moment, this option does not include the loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets.	Property & Land Acquisition
PRP3	Minimise permanent loss of best and most versatile agricultural land (grades 1, 2 and 3)	Review of agricultural grading layer on ArcGIS, based on 2019 Provisional Agricultural Land Classification	A	No Grade 1 or 2 agricultural land is affected and loss of <50% Grade 3 agricultural land	100% is Grade 3 land.	Property & Land Acquisition
PRP4	Assessment of Land and Property asset costs and associated compensation due under the Compensation Code	Review of land use / designation on ArcGIS	G	Land acquisition costs likely to be relatively low.	Based on the information held, the likely acquisition costs will be relatively low, recognising that the Storage Depot will be acquired (as a complete holding) for the reservoir and re-aligned road.	Property & Land Acquisition
PRP5	Assessment of special land considerations, including Special Category Land (SCL) and utility infrastructure, national asset protection agencies and Crown bodies	Review of affected landowners	G	Nature and / or extent Special Category Land is likely to cause low consenting risk	Based on the information held, there appears to be no Special Category Land.	Property & Land Acquisition
PRP6	Assessment of disruption to landowners' access to their land during construction and operation	Review location in conjunction with existing road network	G	Low disruption to landowners' access to their land during construction and operation	The construction of the reservoir will change the access routes in the area, and so it is assumed that construction of the water treatment works will not directly cause a problem with access to land in the area.	Property & Land Acquisition

D. WTW Placement Option 4 Criteria Workbook

Water Treatment Works - Option 4

Criteria code	Criteria Description	Method of Assessment	RAG	Description of RAG	Narrative	Sub-Theme
Constructability						
CON1	Safety - Risk of endangering construction workers or members of the public during construction e.g. water, ground, height, rail, road and utilities	Look at programme and list types of construction involved. Identify any that could potentially score red or amber. Sub-list of activities which would make it amber i.e. Tunnelling = Amber	A	Works can be constructed safely but enhanced control measures required	Important construction activities associated with the SESRO construction program need to be taken into account during the installation of the WTW and associated pipelines. Noteworthy considerations related to Option 4 with regards to laying of the associated pipework include the following: • Potable pipeline crossing with the Railway • Foul pipeline crossing A34. • Pipeline corridor housing the raw, contingency and potable pipeline crosses the ADC, EWD and conveyance tunnel. The potable pipe also crosses the EWD in an additional location. All these will require enhanced safety control measures. Also, Option 4 has an overhead high voltage cable crossing the site; however, there is ample space that this can be safely avoided without additional safety considerations. Further enhanced control measures are needed to account for the substantial earthworks associated with the SESRO construction, albeit these should be managed by the SESRO contractor. Due to the location of Option 4 away from the reservoir, other SESRO construction activities present reduced safety risk. However, enhanced control measures are still recommended.	Health and Safety
CON2A	Programme - Duration, longest /shortest, but also consider whether the longer duration has an impact on the overall scheme programme	Compare differences in the programmes which would materialise from different options. Consider earthworks seasons.	G	Unlikely to extend the duration of the relevant area of works (e.g. road, rail siding or intake/offtake construction) compared to the Gate 2 SESRO programme and unlikely to impact on overall SESRO Gate 2 programme.	The program timescale may be influenced by several key factors, including pipework length, material transport, and SESRO compound activity. Due to the position of Option 4, which lies south of the SESRO reservoir, there is a moderate need for longer pipelines with larger diameters (for potable, raw, and contingency purposes). The length of foul pipework is significantly reduced for this option. Option 4 is situated in moderate proximity to the raw water pumping station (RWPS) (for raw and contingency connections), in very close proximity to the eastern SESRO border (for foul connection), although it is located away from the southern SESRO border (for potable connection). It is important to acknowledge that the programme impact assessment has been conducted based on potential T2ST programme extensions. The installation of the T2ST WTW is not anticipated to affect the SESRO programme. The associated pipeline installations are likely to occur early in the SESRO programme, and they will be integrated in a manner that minimizes disruption and does not extend the SESRO programme duration. However, it is essential to note that an overall T2ST programme has not yet been finalized, and therefore, the full interactions with the T2ST programme have not been thoroughly assessed.	Programme
CON2C	Programme - Dependencies i.e. proximity or physical relationships between elements of scope that introduce programme dependencies	Is the options on the critical path? Will it impact other critical activities?	A	Several major dependencies/ multiple minor dependencies	Construction of the T2ST WTW alongside the SESRO reservoir introduces dependencies for all options. If the contractor for SESRO and T2ST (within the SESRO boundary) is the same, the risk associated with programme disruption and dependencies is greatly reduced. T2ST construction is due to start in 2034, to be brought into service by 2040. SESRO construction is due to start in 2024, to be brought into service by 2040. The T2ST WTW pipeline corridors follow the access road around the reservoir, introducing a programme dependency. Construction of the T2ST WTW is dependent on the completion of various access roads and construction compounds. The T2ST WTW is also dependent on the completion of the SESRO reservoir and associated pumps to enable operation of the works.	Programme
CON2D	Programme - Risk	Are there items in the construction which have a significant programme risk	G	Minor programme risk	Option 4 is located away from all other major construction activities and therefore, the programme risk is low. Increased pipework lengths increase the overall risk when comparing against other options. Option 4 has the second lowest overall pipeline length, thus scoring more favourably.	Programme
CON3A	Logistics - Space available for construction and materials storage	Determine space constraints using GIS and options layouts from option definition.	G	Adequate space	Option 4 offers abundant space for construction, materials, and storage.	Logistics
CON3B	Logistics - Suitable and efficient access for construction workers, deliveries and waste removal including minimisation of lengths of new roads for access during construction	Determine method of access using GIS and options layouts from option definition.	G	Adequate access is available with no or minimal additional road length required for construction of the option.	Option 4 is strategically positioned away from other major construction, making it highly desirable from a vehicular logistics perspective. The access road length for construction workers, deliveries, and waste removal totals approx. 2,900m from Marcham road roundabout (A415 to SESRO Access road). Notably, a significant portion of this road infrastructure is not entirely "new" to the WTW since it will also serve the construction needs of SESRO.	Logistics
CON3D	Logistics - Haulage distance required for construction materials arrival on site to the placement location	Determine length using GIS and options layouts from option definition.	G	For WTW: No or minimal haulage distance required.	The distance from Marcham road roundabout (A415 to SESRO Access road) to Option 4 is approximately 2,900m. This is a minimal haulage distance.	Logistics
CON3E	Logistics - Vehicle movements	Use vehicle movement estimates to assess different options.	A	Construction likely to add vehicle movements.	The main difference between sites with regards to the number of vehicle movements is the relative number of pipe lengths required to be transported to site. All other material transportation is similar for all sites. Option 4 has approx. 7,400m length of larger diameter pipes (potable/raw/emergency) and 300m length of the smaller diameter pipes (foul). This is estimated as a total of 305 trips, which is a significant number of vehicle/truck deliveries.	Logistics
CON4B	Construction Complexity - Location conflict/opportunity with another engineering component of the scheme or other SRO/non-SRO schemes, e.g. STT, T2ST, SWOX/Farmoor	Expert judgement and knowledge of surrounding schemes	G	Location / layout of option provides an opportunity to be developed along with another component of this scheme (or another scheme)	The site selection work is progressing on the assumption that the T2ST scheme will use the SESRO reservoir. The construction of the T2ST WTW within the SESRO boundary is an example of utilising opportunity to develop schemes alongside each other. Where possible, the road network within the SESRO boundary is being utilized for the T2ST pipeline corridors.	Construction complexity
CON4C	Construction Complexity - Minimise the number and complexity of additional structures/assets required or modifications to the existing structures/assets in order to facilitate the option, e.g. bridges, culverts, crossings	Determine using GIS and options layouts from option definition.	A	Option requires a moderately complex (mitigation likely) and/or moderate number of additional structures and/or modification to existing structures.	No modifications to the WTW compound required at this location. All options require the potable main to cross under the railway The greatest unique complexity associated with Option 4 is the potable, raw and contingency pipeline corridor (Corridor IDs 3 & 5) intersecting with the main SESRO tunnel. Option 4 also requires the foul pipe to pass under the A34 out-with the main SESRO tunnel.	Construction complexity
CON5A	3rd Party Impact - Potential to disrupt existing road network during enabling works and construction	Expert judgement	A	Disruption likely to be moderate	The potential disruption associated with SESRO construction heightens the sensitivity to additional vehicle movement. Therefore, the extra vehicle movement required for WTW and pipeline construction is expected to moderately impact the A34 and Marcham Road. However, the option's moderately close position to the pumping station slightly minimises the required increase in vehicle movements, as previously covered in CON3E. Notably, no additional crossing points of existing road networks are associated with this site.	3rd Party Impact
CON5B	3rd Party Impact - Potential to disrupt existing rail network during enabling works and construction	Expert judgement	G	Disruption likely to be limited	No disruption to the rail network anticipated. A worst case scenerio is currently assumed, whereby no construction materials will be delivered via the rail siding.. All WTW options necessitate the potable pipe to cross the railway (which is to be constructed by T2ST).	3rd Party Impact
CON7A	Ground - Terrain of site, and implications for the need for earthworks and engineered slopes	Use of lidar and civil 3D models to assess amount/location of earthworks required	A	Terrain is unfavourable to the design of assets and therefore increases the amount of earthworks required	Generally, it is assumed that the WTW will be built at ground level (i.e., no deep excavations, using shallow foundations). Rough estimates using the Lidar data and assuming the site will be levelled for construction purposes (using the lowest point within the site boundary as reference base layer) show that Option 4 will require approx. 220,000 m3 of earthworks. Also, Option 4 is in an exposed location that will require significantly higher earthworks and manipulation for landscaping and screening the WTW from view.	Construction complexity

CON7C	Ground - Impact of ground conditions on the complexity of design and construction	Use of expert judgement	G	Ground conditions are unlikely to increase the complexity of design and construction with likely only a minimal (if any) impact on cost or requirement for materials that are difficult to source	The geology of the options varies due to the regional dip. In the south-east of the SESRO site, there are layers of Gaulty Clay, Lower Greensand, Kimmeridge Clay, and Corallian. Conversely, the north-west portion of the site contains only the latter two layers. Despite the geological differences, it is not expected to significantly impact construction	Construction complexity
CON7E	Construction Complexity - Complexity of pipeline installation within corridors	Expert judgement	A	The pipeline route faces several challenges that increase its complexity and risk. These include passage through congested pinch points, risk of ground settlement, and/or obstacle avoidance	All options require the potable pipeline to cross the railway on the south of the reservoir and the foul pipework under the A34. For Option 4, the pipeline corridor for the raw / contingency / potable water will cross the tunnelling for the intake / outfall of the reservoir at one point. This introduces a complexity to the installation / construction of the pipework. However, conversations with the tunnelling team indicate that this is manageable. This pipeline corridor also crosses the ADC and EWD, as well as the potable pipeline crossing the EWD in an addition location. Also, Option 4 has an overhead high voltage cable crossing the site; however, there is ample space that this can be safely avoided .	Construction complexity
Operability						
OPS1B	Safety - Access and egress for operational staff, visitors, deliveries and waste removal during normal operations and emergencies	Expert judgement	G	Access/egress can be provided	During typical operations, access restrictions in Option 4 are minimal. For emergency situations, major emergency services (Hospital, Police, Fire station) have good access to A415 and can easily reach site via the available and proposed routes, with Option 4 being approximately 5km away from the three main emergency services in Abingdon used as reference.	Health and Safety
OPS4C	Reliability - Impact of WTW location on gravity discharge of excess water e.g. overflows and contingency / commissioning discharges	Expert judgement	A	Pumping is required potentially introducing a single point of failure but mitigation measures can be introduced to avoid interruption to supply.	Contingency - In the worst-case scenario, the static head to overcome in the wet well is 55m. Option 4 includes 1,400m of contingency pipework. The ground level of Option 4 at its lowest point is 55.25m. This equates to a negative gradient, thus requiring pumping. Foul - Foul waste for all options will need to be pumped to Abington STW. Sludge generated during the water treatment process will be transferred via the foul pipe. Currently, it remains undecided whether the foul pipe serving the T2ST WTW will be shared with SESRO recreational facilities.	Operational Resilience
OPS5B	Adaptability - Flexibility for future modifications e.g. increasing reservoir storage volume, rail station at wantage and grove, construction of Marcham Bypass	Expert judgement	G	Option includes a large degree of flexibility for future modifications	Option 4 has an area of approximately 0.29km2, which leaves about 0.21km2 for future expansion / modifications to the site. This leaves flexibility for future expansion. However, it should be noted that the revised South Abingdon bypass is currently planned to pass through the land occupied by Option 4. Placement of the WTW in this location will reduce the flexibility for land use external to the WTW. There is however a high likelihood that the SESRO project will require this land irrespective of whether or not the WTW is situated in this location, therefore the bypass plan does not affect the RAG score for this option.	Operational Resilience
OPS7A	Sustainability - Reuse of assets or temporary works for permanent items, e.g. materials storage slab, haulage roads, compound car park	Expert judgement	R	N/A - Options should not be scored red if they cannot use existing assets	Option 4 entails establishing a new WTWs and presents limited potential for asset reuse or temporary works	Operational Resilience
OPS8A	3rd Party Impact - Potential to disrupt existing road network during operation	Expert judgement	G	No disruption likely / possibility of enhancement	The proposed changes are anticipated to have minimal impact on the existing road network. Operational chemical deliveries are estimated at approximately 4 tankers per week. Access to Option 4 will be facilitated via Marcham Road using the A34, which should help reduce the impact on local villages.	Transport Planning
Relative Costs						
COS1	Capex cost of the option	Cost estimate calculation for each option.	A	CAPEX estimated to be 2% to 10% of the estimated Gate 2 CAPEX for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major cost differentiator will be the cost of the pipelines (to and from the site). Option 4 costs approximately 4% of the estimated Gate 2 (November 2022) Capex for the overall T2ST project.	Cost
Carbon Costs						
CAR1	Carbon emissions associated to the Capex of the option	Carbon estimate calculation for each option.	A	Emissions (tCO2e) estimated to be 2% to 10% of the estimated Gate 2 emissions (tCO2e) for the overall T2ST project.	The unit operations in the treatment works will be the same regardless of the site. The major carbon differentiator will be the carbon associated with the pipelines (to and from the site). Option 4 accounts for approximately 3% of the estimated Gate 2 (November 2022) Capex Carbon emissions for the overall T2ST project.	Carbon
CAR3	Opportunity for mitigation e.g. smaller earthworks may lead to less carbon	Carbon estimate calculation for each option.	A	Limited likelihood and magnitude of mitigation opportunity.	Option 4 is in an exposed location that will require significant earthworks and manipulation for landscaping and hiding the WTW from view, which has significant carbon emissions associated.	Carbon
Environmental Performance						
ENV1A	Minimise impacts on Special Area of Conservation	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no SAC's or potential SAC's within the boundary of the proposed Option 4 WTW. The closest SAC to the proposed WTW is 3.7km to the north (Cothill Fen SAC).	Biodiversity and Nature Conservation
ENV1B	Minimise impacts on Special Protection Area	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no SPA's or potential SPA's within the boundary of the proposed WTW Option 4. The closest SPA to the WTW is Thames Basin Heaths SPA located 40.5km to the south-east.	Biodiversity and Nature Conservation
ENV1C	Minimise impacts on Ramsar	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no Ramsar sites or potential Ramsar sites within the boundary of the proposed WTW Option 4. The closest Ramsar to the WTW is South-west London Waterbodies located 56.8km to the south-east.	Biodiversity and Nature Conservation
ENV1D	Minimise impacts on Site of Special Scientific Interest	Professional Judgement and use of MAGIC maps.	A	Construction area or access road located within statutory sites; mitigation may be required but option still feasible OR designated site indirectly impacted but mitigation likely to be effective	There are no SSSI's within the boundary of the proposed WTW Option 4. The closest SSSI to the WTW is Barrow Farm Fen SSSI located 1.4km to the north. The proposed WTW location is located within the SSSI Impact Risk Zone (IRZ) for Barrow Farm Fen SSSI. There is potential for impact on the SSSI through air pollution including industrial processes, slurry lagoons and combustion processes from industry.	Biodiversity and Nature Conservation
ENV1E	Minimise impacts on National Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no NNR within the boundary of the proposed WTW Option 4. The closest NNR to the WTW is located 3.9km to the north. Cothill NNR.	Biodiversity and Nature Conservation
ENV1F	Minimise impacts on Local Nature Reserve	Professional Judgement and use of MAGIC maps.	G	No statutory designated sites within 100m of proposed option footprint OR no indirect impact on statutory designated site	There are no LNR within the boundary of the proposed WTW Option 4. The closest LNR to the WTW is located 4.3km to the north-east of the site. The site is called Abbey Fishponds LNR.	Biodiversity and Nature Conservation
ENV2A	Minimise impacts on Ancient Woodland	Natural England Ancient Woodland Maps and Professional Judgement.	G	No ancient woodland impacted	Historic mapping indicates that there is no ancient woodland present on-site	Biodiversity and Nature Conservation

ENV2B	Minimise impacts on Ancient and Veteran Trees	Woodland Trust Ancient Tree Inventory map search and professional judgement	A	Development in close proximity with potential indirect impact to ancient or veteran trees	There are no ancient or veteran trees recorded by the Woodland Trusts Ancient Tree Inventory on or close to this option. However, survey may identify trees that could be classified as ancient or veteran. As such, this option scores amber on a precautionary basis pending survey.	Biodiversity and Nature Conservation
ENV2C	Minimise impacts on Protected Trees	Check against published TPO dataset.	G	No protected trees impacted	No protected trees would be impacted.	Landscape & Visual
ENV2D	Minimise impacts on vegetation (including trees, woodland, hedges and shrubs)	Check against baseline resources and based upon high level knowledge of site from previous site visits. Professional judgement.	A	Direct impact on vegetation within a moderate proportion of construction footprint, which is of high arboricultural/amenity value (e.g. A or B grade) or biodiversity habitat in good condition. OR Direct impact on vegetation within large proportion of construction footprint, which is of lower arboricultural/visual amenity value (e.g. C grade) or biodiversity habitat in poor condition.	Construction of WTW Option 4 and associated pipelines will require the removal of hedgerow and broadleaved woodland habitat. This may include A or B grade trees. The majority of impacts will be restricted to arable fields with limited biodiversity value.	Biodiversity and Nature Conservation and Landscape
ENV3	Minimise impacts on Local Wildlife Sites (LWS)	Professional Judgement and LWS Citation provided by TVERC.	G	No impacts to LWS	There are no LWS within the boundary of the proposed WTW Option 4. The closest LWS to the WTW and associated pipeline is located 1.3km to the west at The Cuttings and Hutchin's Copse LWS. The WTW pipeline is considered to be far enough away from the LWS that there will be no direct or indirect impact on the LWS.	Biodiversity and Nature Conservation
ENV4A	Minimise impacts on Scheduled monuments or activities which could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The land assessed associated with the option is 770m west of the scheduled Sutton Wick settlement.	Historic Environment
ENV4B	Minimise impacts on listed buildings or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The nearest Listed Building lies 880m south east of the land assessed, within the village of Drayton and, given the building's location, there would be no visual intrusion arising from the option. The Listed Marcham Mill and Marcham Mill Bridge 900m west are unlikely to be affected in terms of setting.	Historic Environment
ENV4C	Minimise impacts on Registered Parks and Garden or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Grade II Registered Park and Garden of Albert Park in Abingdon lies 1.9km north east of the option and changes to setting will not occur.	Historic Environment
ENV4D	Minimise impacts on Registered Battlefields or activities that could lead to a loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The 1643 Battle of Chalgrove lying 17km east of the option is the nearest Registered Battlefield and changes to setting will not occur.	Historic Environment
ENV4E	Avoid impacts on World Heritage Sites or activities that could lead to a loss of significance, including setting	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The Blenheim Palace World Heritage Site lies 18.9km to the north of the option and changes to setting will not be a material consideration.	Historic Environment
ENV4F	Minimise impacts on conservation areas which could result in loss of significance	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Permanent infrastructure more than 500m from designated heritage asset and/or no likely setting effects. Construction area not located within 100m of designated heritage assets	The option lies between the Marcham and Drayton Conservation Areas with the option lying closer to Drayton (930m) to the south east than Marcham (1.5km) to the north west.	Historic Environment
ENV5A	Minimise loss to non-designated built heritage	Professional judgement, incorporating Historic England's Good Practice Advice Note no.3 regarding the setting of heritage assets	G	Extensive loss of non-designated built heritage of low value within the permanent infrastructure zone and adverse changes to within a 500m area from the edges of the permanent infrastructure OR more limited effects on non-designated built heritage of medium value	Nearest non-designated built heritage will lie approximately 450m to the south east of the limit of land assessed at the northern end of the village of Drayton. No indication of any specific assets on available dataset but that is more a representation of archaeological assets rather than existing historic built heritage.	Historic Environment
ENV5B	Minimise loss to paleoenvironmental remains	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	A	Extensive scale of loss or damage to medium value remains within the construction area and adverse changes to similar buried remains in a 1km area around the permanent infrastructure from temporary and permanent changes to local hydrogeological regimes OR more limited effects on remains of high value	Option lies adjacent to the River Ock whose floodplain will contain paleoenvironmental remains, though the extent and significance of these remains are unknown. A medium value has been assumed for the purposes of optioneering.	Historic Environment
ENV5C	Minimise loss to non-designated historic landscapes	Professional judgement, based on Historic England's guidance on the establishing the significance of heritage assets	G	Extensive scale of loss or extensive changes to low value non-designated historic landscapes within the construction area and extensive changes to the setting of the same resource outside the permanent infrastructure OR more limited effects on non-designated historic landscapes of medium value	No such assets present within the HER dataset or obvious from aerial images.	Historic Environment
ENV5D	Minimise loss of non-designated archaeological remains	Professional judgement, incorporating the use of the IEMA's Principles of Cultural Heritage Assessment in the UK and the Chartered Institute for Archaeologists standard and guidance document for desk based assessment	G	Permanent infrastructure and construction area will result in the loss and / permanent damage to non-designated buried and extant archaeological remains worthy of local significance which can be adequately mitigated through preservation by record	Scores green as there are no direct or indirect impacts to heritage designations. There are no known archaeological remains identified but further archaeological investigation may be required to inform mitigation. Any potential impacts to buried archaeological remains can be mitigated.	Historic Environment
ENV6C	Minimise impacts of groundwater flood risk.	Checking existing national and local records	G	No predicted impacts on groundwater flood risk	Design groundwater level is generally uniform across the site (currently taken as GL-1m). There is no additional information that specifies that there is a difference between the different sites.	Flood risk
ENV7A	Minimise disturbance of potentially contaminated land	Checking existing national and local records	A	Disturbance of potentially contaminated land with one or more of the following properties: - Unlikely to have significant / showstopping cost or program implications - Unlikely to cause significant harm to potential receptors - Can be easily mitigated and remediated	Old canal (likely infilled) runs along the north western boundary and be a potential source of contamination. Cuttings (likely infilled ground are also located within 85m of the site). Option located on Grade 2 and 3a BMV agricultural soil (2008 detailed survey).	Land Quality
ENV7B	Minimise disturbance of potentially contaminated land specifically in relation to authorised and historic landfills	Checking existing national and local records	G	Not within authorised and historic landfills or previous industrial sites or within 250m of authorised and historic landfills or previous industrial sites	No landfills known to be located within 250m	Land Quality
ENV8	Minimise disturbance of land with known potential for Unexploded Ordnance (UXO)	Checking existing national and local records	G	No disturbance of land contaminated by UXO	UXO HE (high explosives) have been recorded in limited areas within the site by Zetica. It is assumed that unexploded ordnance (UXO) threat would be mitigated for the entire study area prior to any mobilisation or construction work. Therefore it is expected that the area will be monitored and UXO identified and disposed of prior to construction work.	Land Quality

ENV9A	Minimise loss of terrestrial priority habitats (use narrative to describe type and quantum)	Use of aerial imagery, MAGIC maps and Professional Judgement	A	Priority habitat directly impacted but mitigation feasible	Habitats within the site of the WTW Option 4 and associated pipeline include hedgerows and Lowland Mixed Deciduous woodland which are classified as priority habitats under the NERC Act (2006). No other habitats of significant biological importance will be lost as a result of construction of WTW Option 4.	Biodiversity and Nature Conservation
ENV9B	Minimise loss of aquatic priority habitats (use narrative to describe type and quantum)	Professional judgement based on knowledge of Water Framework Directive.	A	Priority habitat directly impacted but mitigation feasible	The pipeline associated with this option requires a crossing with the EWD at two separate locations. This means that the pipeline would need to be installed first to avoid disturbance but there is a potential for reduced habitat quality as the new EWD would largely need to be cut into fill (which would need to be a cohesive material) over the pipeline not in the existing ground profile as had been planned. There would need to be sufficient headroom between the bed of the channel and the soffit level of the pipe for this to work.	Aquatic Environment
ENV10A	Reduce effects on North Wessex Downs AONB and its setting	Professional judgement.	A	AONB and its setting likely to be affected. Effect is unlikely to be significant.	Introduction of water treatment works within the arable landscape would erode the setting of the North Wessex Downs National Landscape. Likely intervisibility with the North Wessex Downs National Landscape. The effect on the landscape character and tranquillity of the National Landscape and its setting would be unlikely to be significant due to the distance and opportunities to incorporate mitigation.	Landscape & Visual
ENV10B	Reduce effects on local landscape character	Professional judgement.	R	Effect on local landscape character is likely to be significant.	Introduction of water treatment works within the arable landscape would erode the local landscape character. Effect could potentially be significant locally, depending on design solution. Site clearance for the construction of the WTW and installation of pipelines would require the removal of existing hedgerows and trees which are largely limited to field boundaries. Easements around the pipelines could limit planting. Pipelines would be buried so, on the whole, only construction effects are relevant to landscape effects. With the exception of vegetation loss that cannot be replaced due to easements these effects would be temporary and therefore the location of the pipelines should not be a determining matter for the location of the WTW.	Landscape & Visual
ENV11A	Reduce effects on panoramic views from national trail, open access land and important viewpoints in AONB	Professional judgement.	A	Effect on panoramic views from national trail, open access land and important viewpoints in AONB unlikely to be significant.	Likely distant but open views from the North Wessex Downs National Landscape including The Ridgeway National Trail. Effect unlikely to be significant due to the distance with appropriate mitigation applied.	Landscape & Visual
ENV11B	Reduce effects on sensitive local visual receptors	Professional judgement.	R	Effect on local views of sensitive visual receptors likely to be significant.	Water treatment works likely to be visible from local PRoW and in open views from properties on north-western edge of Drayton although vegetation along the A34 would provide screening for many properties further south-west in Drayton. Possible distant filtered views through existing vegetation from the edge of Marcham to the north over 1.2km away and the Corallian Limestone Ridge, including Oxford Green Belt Way. Effect on local views likely to be significant.	Landscape & Visual
ENV12	Minimise disturbance/encroachment into Air Quality Management Area (AQMA)	Based on an understanding of the scale and nature of activities, air quality management areas (AQMAs) were identified in close proximity to the proposed works.	G	Site is located further than 1km from AQMA OR no construction traffic must go through an AQMA	Marcham AQMA is the closest AQMA to Option 4 and is approximately 1.4km north-northwest of the indicative permanent WTW footprint at its closest point. The anticipated construction and operational activities would likely lead to a negligible change in air quality.	Air Quality
ENV13	Minimise disturbance/encroachment into Groundwater Source Protection Zone (SPZ)	Magic maps	G	Site is within Zone 3 or not within a SPZ	No Groundwater Source Protection Zones within the vicinity of the SESRO site.	Aquatic Environment
ENV14A	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Cow Common Brook and Portobello Ditch' WFD waterbody (GB106039023360) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	R	Major adverse impacts likely; high risk to ability to attain Water Framework Directive objectives for this waterbody	The siting of the WTW at Option 4 would have no impact on watercourses. However, there is a serious risk/implication of the associated pipeline route crosses the Eastern Watercourse Diversion at two separate locations. There is a risk to WFD compliance since the narrative used to date within the WFD assessment and the accompanying Applicability Assessment is that the new watercourses around the site will be excavated and then left to recover without further interference. Since the pipeline is assumed to be open cut and is to be placed underneath the EWD there is a risk in the programme since the pipeline would need to be installed first to ensure no disturbance to the EWD once excavated. There is already the potential for poorer habitat quality since the EWD would have to cut into fill over the pipeline but if the pipeline is not dug before the EWD then there is a risk of significant disturbance to the EWD unless the pipeline is tunnelled and not open cut.	Aquatic Environment
ENV14B	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ock and tributaries (Land Brook confluence to Thames)' WFD waterbody (GB106039023430) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14C	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Thames (Evenlode to Thame)' WFD waterbody (GB106039030334) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14D	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Sandford Brook (source to Ock)' WFD waterbody (GB106039023410) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14E	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Childrey Brook and Norbrook at Common' WFD waterbody (GB106039023380) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV14F	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Ginge Brook and Mill Brook' WFD waterbody (GB106039023660) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment

ENV14G	Option does not affect Water Framework Directive (WFD) Quality Elements within one of WFD waterbodies downstream of the River Thame to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives. These WFD waterbodies include: - Thames Wallingford to Caversham - WFD waterbody GB106039030331 - Thames (Reading to Cookham) - WFD waterbody GB106039023233 - Thames (Cookham to Egham) - WFD waterbody GB106039023231 - Thames (Egham to Teddington) - WFD waterbody GB106039023232	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	G	Minor adverse impacts likely; no risk to attaining Water Framework Directive objectives for this waterbody	There would be no measurable impact of the siting for this option of the WTW or the pipeline on this waterbody.	Aquatic Environment
ENV15A	Maximise potential for future environmental benefits (terrestrial), e.g. increase tree planting	Professional Judgement	R	Site allows only the minimum environmental benefits to be realised	No specific space for environmental benefits and removes areas of woodland, scrub, pond and hedgerow habitat. There may be potential for environmental benefits	Biodiversity and Nature Conservation
ENV15B	Maximise potential for future environmental benefits (aquatic), e.g. increase wetlands area	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some additional environmental benefits to be realised	The siting of the WTW will not effect the delivery of environmental benefits. However, there is a serious risk that the associated pipeline reduces the habitat quality associated with the Eastern Watercourse Diversion as it will have to be sited on the same alignment of the pipeline for a significant length. To be possible, a cohesive material would need to be installed on the pipeline and cut into to form the diversion.	Aquatic Environment
ENV16	Maximise flexibility in routing diverted watercourses so their habitats can be of sufficiently high quality to contribute to catchment Water Framework Directive objectives	Professional judgement based on knowledge of Water Framework Directive and Biodiversity Net Gain legislation	A	Site allows some flexibility in routing watercourses / Good quality habitat options are available	The siting of the WTW will not affect the diverted watercourses. However, there is a serious risk that the associated pipeline reduces flexibility and habitat quality with the Eastern Watercourse Diversion as it will have to be sited along the same alignment of the pipeline for a significant length. To be possible, a cohesive material would need to be installed on the pipeline and cut into to form the diversion. This has the potential to reduce the overall habitat quality that can be delivered as a result.	Aquatic Environment
ENV17	Minimise disturbance/encroachment into Local Geological Sites (LGS)	Checking existing national and local records	G	Site is located more than 250m from LGS	No LGS present	Biodiversity and Nature Conservation
ENV18A	Minimise impacts associated with Noise and Vibration as a consequence of the construction of the option	Professional judgement informed by published guidance such as BS5228 and LA 111, and experience of relevant schemes, including the 300km Strategic Pipeline Alliance scheme. Assumed that well established generic mitigation measures will be put into place as required. Assumed that well established generic mitigation measures will be put into place as required. Indicative RAG assessment, with Red band being the distance from the works site to the SOAEL+5dB distance, and Amber is from SOAEL+5dB distance to the SOAEL. Construction of WTW: Red 69m, Amber 70-380m, Green 381m. Professional judgement used in assigning a single RAG rating for each option under review, which includes a review of the number of properties in each band and how close they are located to the RAG boundaries. Property counts do not consider screening of receptors by nearby buildings, screening at second row of properties by first row of properties. This will result in a precautionary assessment of noise impacts. NOTES: buildings to be demolished are excluded from assessment, RAG bands based on assessment approach for residential properties but all NV sensitive receptors identified at Gate 2 are included in analysis.	G	Impacts unlikely, or adverse impacts are likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW site boundary ('Land to be assessed')): 555m - Willow Way, Drayton Numerous props. in Drayton ~600/700m 580m - New Cut Mill House & Cottage, Mill Road, Abingdon 715m - Meadow Farm House, Mill Road, Marcham 970m - Rushey & Marcham Mill, Mill Road, Marcham [540m Vis.&Comm. Centre (to WTW footprint)] Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Road & The View, Steventon Advantages: Presence of A34 results in elevated prevailing background and ambient noise levels in Abingdon and Drayton. Likelihood of significant adverse effects: Construction: Low. Although there is the potential for elevated noise levels above the SOAEL at a property in the vicinity of the pipeline, it is anticipated that open-cut trenching works would be restricted to daytime only works and would progress quickly, so wouldn't trigger the temporal element of the BS5228-1 noise criteria. It is also assumed that suitable noise mitigation would be adopted during pipe laying works when close to noise sensitive properties.	Noise
ENV18B	Minimise impacts associated with Noise and Vibration as a consequence of the operation of the option	Professional judgement informed by published guidance such as BS4142, BS8233 and the WHO Night Noise Guidelines for Europe and experience of relevant schemes including Frankley WTW extension and a UU WTW. Assumed that well established generic mitigation measures will be put into place as required. The assessment approach is as per that outlined above (ENV18A), but with the following RAG distances for operational noise impacts: Operation of WTW: Red 74m, Amber 75-400m, Green 401m.	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Closest Receptors (approx. distance to WTW site boundary ('Land to be assessed')): 555m - Willow Way, Drayton Numerous props. in Drayton ~600/700m 580m - New Cut Mill House & Cottage, Mill Road, Abingdon 715m - Meadow Farm House, Mill Road, Marcham 970m - Rushey & Marcham Mill, Mill Road, Marcham [540m Vis.&Comm. Centre (to WTW footprint)] Closest Receptors (approx. distance to pipe corridors): 30m - Westbury House, Hanney Road 270m - 160 Hanney Rd & The View, Steventon Advantages: Presence of A34 results in elevated prevailing background and ambient noise levels in Abingdon and Drayton. Likelihood of significant adverse effects: Operation: Low. Assumes no operational noise from proposed pipeline routes (Raw, Potable, Foul/Sludge & Contingency).	Noise
ENV19A	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the construction of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) and no statutory designated sites in the vicinity of Option 4. However, there is a residential property (Westbury House, Hanney Road), which is less than 50m from the associated pipeline (assuming open cut / cut & cover). It is considered that there are no proposed dust-generating construction activities that could not be managed using normal good practices (see IAQM construction dust guidance, 2024) to prevent significant effects at any "off-site" receptor.	Air Quality
ENV19B	Minimise impacts associated with Air Quality including dust, smell, fumes and smoke as a consequence of the operation of the option	Based on an understanding of the scale and nature of activities, sensitive receptors were identified in close proximity to the proposed works.	G	Based on the on the scale of the activities and number, proximity and sensitivity of nearby sensitive receptors (including the nearby Marcham AQMA), the potential for a significant effect is unlikely / air quality impacts are negligible. An appropriate level of mitigation may still be required to reduce risk of impacts occurring.	There are no high sensitivity human receptors (i.e. dwellings) and no statutory designated sites in the vicinity of Option 4. During operation of the WTW, given the likely size / number of required diesel fuelled generator(s) and distance to the nearest sensitive receptors, the potential effects would likely lead to a negligible change in air quality.	Air Quality
ENV20A	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the construction of the option	Professional judgement.	A	Noticeable changes to visual amenity of local community	Noticeable change to visual amenity of local community in Drayton during construction, including due to lighting, would be limited to some extent due to presence of A34.	Landscape & Visual
ENV20B	Minimise impacts associated with Visual Amenity including light pollution, as a consequence of the operation of the option	Professional judgement.	G	Barely perceptible changes to visual amenities, with no or little effect on local community	Change to visual amenity of local community in Drayton during operation, including due to lighting, would be limited to some extent due to presence of A34 and could likely be mitigated long-term with sensitive design, earthworks and planting.	Landscape & Visual
ENV21A	Minimise impacts associated with solid discharge during construction.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution
ENV21B	Minimise impacts associated with solid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids unlikely	Pollution
ENV22A	Minimise impacts associated with liquid discharge during construction,.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Any release of solids likely to be readily mitigatable using standard controls	Pollution

ENV22B	Minimise impacts associated with liquid discharge during operation.	NA	G	Impacts unlikely, or adverse impacts likely to be mitigated if they occur	Liquid discharge release should be prevented by appropriate site management.	Pollution
Community and Planning Considerations						
CPC1	Distance to the nearest property that will stay during construction (metres)	GIS	G	501m plus from the nearest property	The closest property to Option 4 is a property in Drayton Village, which is a distance of approx. 760m away. All other properties are >1,600m away from the Option 4.	Socio-Economic
CPC2	Minimise impacts on local community during construction associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during construction	The closest property to Option 4 as indicated by GIS map layers on MOATA is approx. 600m a property. This is on the border of a 500m buffer. Noise and Air Quality have indicated that there are no significant impacts expected so socio-economics will echo this.	Socio-Economic
CPC3	Minimise impacts on local community during operation associated with disturbances of community assets such as schools, hospitals, GP surgeries, schools, libraries, youth centres, Country Parks, allotments, green open spaces and disruptions to recreation	GIS analysis of footprint, community assets, and links with residences.	G	Community access/use of community assets is not disrupted during operation	The closest property to Option 4 as indicated by GIS map layers on MOATA is approx. 600m a property. This is on the border of a 500m buffer. Noise and Air Quality have indicated that there are no significant impacts expected so socio-economics will echo this.	Socio-Economic
CPC4A	Are public rights of way disrupted or adversely affected?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	A	Recreational resources / rights of way of local importance are disrupted or affected. The site is likely to affect public rights of way	PRoW from Drayton to the reservoir area are adversely affected by this chosen location.	Socio-Economic
CPC4B	Are there opportunities to create or improve linkages of Public Rights of Way (PRoW) and recreational routes?	GIS analysis of PRoW, open spaces, cycle routes, canals and other forms of regional or nationally important receptors (e.g. National Cycle Routes).	R	No opportunity to create or enhance PRoW or links to recreational resources	PRoW from Drayton are severed. If the ADC is included within the design, this passes the WTW in close proximity which would reduce the amenity and wellbeing benefits received from that path's use.	Socio-Economic
CPC5	Maximise potential opportunity for recreational benefits	GIS analysis of PRoW, open spaces, cycle routes, canals, other forms of regional/nationally important receptors (e.g. National Cycle Routes), and community assets.	R	Option allows only the minimum recreational benefits to be realised	The positioning of Option 4 is in full view of potential visitors to the reservoir and therefore could be disruptive to people's enjoyment of the new community assets being provided by the restaurant/community centre/education centre that are in close proximity. It could also dissuade visits to the sites. This would especially be the case for visitors using the ADC as the green/blue space would lose utility being in close proximity to a large industrial space.	Socio-Economic
CPC6	Support the realisation of socio-economic incentives on SESRO, including employment, skills, tourism, sustainable travel, connecting people with nature and environmental education	GIS analysis of footprint, community assets, private residents, and businesses. Also awareness of overall project objectives is needed to conclude if the designs align with these.	R	Site does not support the social-economic incentives of the overall scheme	The positioning of Option 4 is in full view of potential visitors to the reservoir and therefore could be disruptive to people's enjoyment of the new community assets being provided by the restaurant/community centre/education centre that are in close proximity. It could also dissuade visits to the sits. This would especially be the case for visitors using the ADC as the green/blue space would lose utility being in close proximity to a large industrial space.	Socio-Economic
CPC7	Minimise overall SESRO Order Limits extent and land acquisition, without compromising SESRO needs and project benefits	Spatial comparison of land that would likely be included in the DCO Order Limits, including construction working areas, access and highways or PRoW interactions.	A	Requires minor additional Order Limits extent	The WTW option may lie outside land required for reservoir and access road construction works and may lie outside the likely site extent (including landscaping) without the WTW in operation. It is within the area safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031. If included within the Order Limits for the SESRO application, it may require slightly greater Order Limits extent.	Consenting
CPC8	Aim for consistency with published and (insofar as possible) emerging Local Plan land use allocations	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in existing and any emerging Local Plan documents and any Supplementary Planning Documents.	A	Negotiation required with LPA to accommodate scheme within Local Plan	The WTW option is within the land safeguarded for the reservoir (CP14) in the Vale of White Horse Local Plan 2031. The consultation draft Joint Local Plan 2041 shows that Option 4 is located in the same area as the South Abingdon Movement Corridor (Policy IN3 - Transport Infrastructure and Safeguarding), and could possibly conflict with future delivery of any proposals within that corridor. No land use allocation conflicts with the Oxfordshire County Council Minerals and Waste Local Plans.	Consenting
CPC9	Aim for consistency with any adopted Neighbourhood Plan policy applicable to the land area affected	Spatial comparison of allocated sites and other policy areas, and review of policy wording, in any made Neighbourhood Plan.	A	Negotiation required with Parish Council to accommodate scheme within Neighbourhood Plan	The WTW option is within the area of the Made Drayton Neighbourhood Plan, which has a policy that development proposals are required to protect and enhance biodiversity (P-S1: Biodiversity).	Consenting
CPC10	Avoid development of infrastructure within specifically designated areas or their setting, as applicable (e.g. Green Belt, AONB, Common Land, Open Space)	Spatial comparison with designated sites, their settings, and the nature of development works expected.	G	Does not require development of above-ground infrastructure within these designations or development likely to have more than a negligible effect on the setting (where applicable)	Not located within a specifically designated area, such as Green Belt, AONB, Common Land or Open Space.	Consenting
CPC11	Avoid encroachment on any safeguarded land in minerals and waste policy, unless the minerals can be beneficially utilised as a result	Spatial comparison of allocated sites and review of policy wording in existing and any emerging Waste and Minerals Local Plan documents.	G	Low or no impact	Not located in minerals safeguarding area or on a site allocated for minerals or waste uses.	Consenting
CPC12	Ability to integrate with existing nationally-significant infrastructure, statutory undertakers' major infrastructure, or any proposed future Nationally Significant Infrastructure Projects (NSIP) (such as that of National Highways, Environment Agency, Network Rail)	Review of NSIP projects on PINS's register; review of Network Rail and National Highways investment plans; spatial review of statutory undertakers' assets.	G	Low or no interaction with existing infrastructure or proposed Nationally Significant Infrastructure Project (NSIP)	No NSIPs currently registered. No known proposals from Network Rail or National Highways.	Consenting
CPC13	Minimise the consenting complexity due to the need for additional consents and licenses that may be required outside the Development Consent Order (DCO), e.g. additional Flood Risk Activity Permit, Environmental Permit, abstraction/discharge Licence, European protected species licence, etc	Review of the nature of expected development works against the list of other consents and licenses developed at Gateway 2.	A	One or more additional consent/license required	The WTW option will require an Environmental Permit for the discharge of water into surface or groundwater. Option A will also require Land Drainage Consent for works in, over, under of affecting the flow of an ordinary watercourse and a standard or bespoke Flood Risk Activity Permit will also be required as the WTW is in Flood Zone 3.	Consenting

CPC14	Avoid or minimise the need for any consequential development consenting (i.e. displacement or alteration of other development)	Review of existing development within the likely land-take, its nature and scale.	G	No existing development requires planning permission to relocate or alter	There are no planning applications that would be impacted by the WTW or the pipeline. There are no major existing development in use either, rather the WTW and associated pipeline would be located on what is currently arable fields. Utility diversions are expected to be required, but this would likely be the case for SESRO works in this area, and would either form part of the DCO as associated development or potentially could be delivered through statutory undertaker permitted development.	Consenting
CPC15	Minimise interfaces/reliance on external governing/third parties (e.g. Removing the canal removes a stakeholder, reducing interfaces and permissions required from Network Rail, National Highways, National Grid)	Review GIS layers for services against the options. Expert Judgement.	A	Several manageable interfaces with others	Considering the WTW is planned on the SESRO project site and will be receiving raw water from the reservoir, it will be relying on the SESRO programme and its associated activities (most especially the recreational activates planned on the site). The location of Option 4 has a 33 kV high voltage overhead cable passing through the land parcel, though approx. 90m away from the WTW. As part of the SESRO project, initial discussions regarding diversion of cables have been undertaken with the Distribution Network Operator (DNO), with detailed discussions intended as the designs and planning progress. At this stage, it is assumed that diversion of electric cables can be undertaken. There is also a diverted water trunk main within the land parcel. The revised South Abingdon bypass is currently planned to pass through the land occupied by Option 4 Also of importance is the proximity to an intermediate pressure gas main, however, this is >150m away and should not pose an issue (National grid speculates a maximum of 3m clearance).	Consenting
Property & Land Acquisition						
PRP1	Minimise loss of sensitive properties, i.e. residential, commercial, green belt, common land, historical or community assets due to project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of sensitive properties	Based on the information held at the moment, this option does not include the permanent or temporary loss of sensitive properties.	Property & Land Acquisition
PRP2	Minimise loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets due project delivery	Review Land allocation mapping on ArcGIS.	G	No permanent or temporary loss of allocated land for higher value or social value properties	Based on the information held at the moment, this option does not include the loss of land allocated within the Local Plan for alternative higher value / social / cultural value uses, i.e. residential, historical or community assets.	Property & Land Acquisition
PRP3	Minimise permanent loss of best and most versatile agricultural land (grades 1, 2 and 3)	Review of agricultural grading layer on ArcGIS, based on 2019 Provisional Agricultural Land Classification	A	No Grade 1 or 2 agricultural land is affected and loss of <50% Grade 3 agricultural land	100% is Grade 3 land.	Property & Land Acquisition
PRP4	Assessment of Land and Property asset costs and associated compensation due under the Compensation Code	Review of land use / designation on ArcGIS	G	Land acquisition costs likely to be relatively low.	Based on the information held, the likely acquisition costs will be relatively low, recognising that the Storage Depot will be acquired (as a complete holding) for the reservoir and re-aligned road.	Property & Land Acquisition
PRP5	Assessment of special land considerations, including Special Category Land (SCL) and utility infrastructure, national asset protection agencies and Crown bodies	Review of affected landowners	G	Nature and / or extent Special Category Land is likely to cause low consenting risk	Based on the information held, there appears to be no Special Category Land.	Property & Land Acquisition
PRP6	Assessment of disruption to landowners' access to their land during construction and operation	Review location in conjunction with existing road network	G	Low disruption to landowners' access to their land during construction and operation	The construction of the reservoir will change the access routes in the area, and so it is assumed that construction of the water treatment works will not directly cause a problem with access to land in the area.	Property & Land Acquisition

E. Excluded Criteria

Excluded criteria

Criteria code	Criteria Description	Theme	Sub-theme	Description of RAG	Method of Assessment	Reason for exclusion
CON2B	Programme - Opportunities for construction programme acceleration through efficiencies	Constructability	Programme	Programme is a high level indicator of potential cost and disruption of the scheme.	Compare differences in the programmes which would materialise from different options.	No differentiator across WTW location options. At the time of this appraisal (March 2024), it is understood that there would be no differences between the options with regards to programme acceleration through efficiencies, irrespective of the location selected. Typical efficiencies (for example, utilising same contractors for both SESRO and WTW construction) that may be applied are not location specific at this stage of the project.
CON2E	Programme - Use of existing assets to reduce the amount of construction required	Constructability	Programme	Programme is a high level indicator of potential cost and disruption of the scheme. Potential reduction in carbon-footprint.	Identify if any existing assets can be used	No differentiator across WTW location options. At the time of the appraisal (March 2024), it is understood that there are no existing assets within the indicative location for SESRO that could be used to reduce amount of construction requirements for the WTW. This would be the case irrespective of the location selected within the SESRO compound. However, this might not be the case if a different location outside the SESRO compound is considered.
CON3C	Logistics - Import of materials or resources during construction	Constructability	Logistics	High level indicator of potential to reduce carbon-footprint and cost of the scheme.	Use quantity estimates to assess different options.	This is covered by other criteria, e.g. cost of additional pipework (COS1), vehicle movements (CON3D). As the WTW layout and treatment train will be the same irrespective of its location, all other materials (excluding the pipework and its ancillaries) would be identical. This is the case as at the time of this appraisal (March 2024).
CON3F	Logistics - Capacity and layout for stockpiling at the materials handling area to reduce the risk of programme disruption and minimise double handling of material	Constructability	Logistics	Risk management	Determine space using GIS and options layouts from option definition.	No differentiator across WTW location options. Options are derived based on suitable land parcel sizes and therefore if there is inadequate space for construction purposes, optioneering would not progress. This is the case as at the time of this appraisal (March 2024).
CON4A	Construction Complexity - Temporary conditions/works requirements e.g. embankment slope stability and moisture outside of placement seasons.	Constructability	Construction complexity	To check constructability	Expert Judgement	At the time of the appraisal (March 2024), it is not envisaged that any temporary conditions required for the construction would have a material effect on the selection requirement for a suitable location for the WTW.
CON4D	Construction Complexity - Volume and / or complexity of rail signalling interventions required	Constructability	Construction complexity	Construction risk management (cost and programme)	Review technical study to determine RAG assessment	At the time of the appraisal (March 2024), it is established that all transportation requirements for the WTW (construction materials and personnel movement) will be via the road and not the railway. As such, there would be no requirement for rail interventions with respect to the WTW construction.
CON4E	Construction Complexity - Complexity of construction technique e.g. construction of tunnels, ADC or both for the emergency discharge	Constructability	Construction complexity	Construction risk management (cost and programme)	List out the differences in construction complexity (engineering cost risk & stakeholder interfaces risk). Use expert judgement to decide on the assessment. Compare with inclusions on cost to ensure no double-counting.	Replaced by Complexity of pipeline installation with corridors CON7E and we can use CON4C, CON7C. At the time of appraisal (March 2024), all the options (within the SESRO boundary) necessitate the potable pipe crossing the railway and the foul pipe crossing the A34. These have been addressed in CON7E. There is no further complexity that would be unique to any of the options.
CON5C	3rd Party Impact - Potential to disrupt existing solar farm infrastructure during enabling works and construction	Constructability	3rd Party Impact	Reduce impact on stakeholders during construction	Expert judgement	At the time of the appraisal (March 2024), none of the options selected would impact the solar farm infrastructure. This is because the indicative location for SESRO would be cleared of the solar farm infrastructure before the mobilisation for construction. Therefore this criteria is not applicable to this optioneering.
CON7B	Ground - Risk of unexpected conditions	Constructability	Construction complexity	Construction risk management (cost and programme)	Use of expert judgement based on comparable areas	At the time of this appraisal (March 2024), there are no differentiators across WTW location options has been identified. Additional assessment may be required if further options are in future iterations.
CON7D	Ground - Risk of ground settlement above line of tunnel affecting other structures/houses	Constructability	Construction complexity	Construction risk management (cost and programme)	Use of expert judgement	Replaced by Complexity of pipeline installation with corridors CON7E
OPS1A	Safety - Risk of endangering operational staff, visitors or members of the public during operation	Operability	Health and Safety	Legal requirement to consider Health & Safety in design under CDM regulations and other legislation.	Look at operational activities and public access. Identify any that could potentially score red or amber. Sub-list of activities which would make it amber i.e. Tunnelling = Amber	No differentiator across location options. Access and egress risk covered by OPS1B. It should also be noted that the WTW, will be constructed with safety considerations
OPS2A	Maintenance - Ease of maintenance	Operability	Operational Complexity	Minimise operational complexity (risk and cost)	Expert judgement	Replaced by Reliability - Impact of WTW location on gravity discharge of excess water. OPS4C
OPS3A	Performance - Impact of intake location on removal of screenings and large floating debris e.g. rate of removal and volume to be removed	Operability	Operational Complexity	Minimise disruption	Expert judgement	This criterium is not applicable to the WTW.

Criteria code	Criteria Description	Theme	Sub-theme	Description of RAG	Method of Assessment	Reason for exclusion
OPS4A	Reliability - Footprint of the option within flood zones (as an indication of the potential for damage and the challenge of operation / maintenance during flood events)	Operability	Operational Resilience	Scheme continues to be operational during flood conditions	Review GIS supported by expert judgement	All WTW location options outside flood plain. At the time of the appraisal (March 2024), none of the options selected fall within a flood plain.
OPS4B	Reliability - The option does not have a single point of failure but rather includes backup infrastructure so that it can remain in operation if the primary infrastructure is unavailable, e.g. siphons in addition to tunnel for emergency discharge or alternative road route to reservoir crest	Operability	Operational Resilience	Scheme continues to be operational during emergency	Expert judgement	No differentiator across WTW location options. Points of failure, backups and redundancies within the WTW would be addressed as part of the design of the treatment train and as such would be similar irrespective of the location selected.
OPS5A	Adaptability - Space available for future expansion of social / recreation infrastructure	Operability	Operational Resilience	Seeking to have the most adaptable option for future needs beyond planning period	Expert judgement	N/A - WTW expansion covered by Adaptability - Flexibility for future modification (OPS5B)
OPS6A	Evolvability - Risk to operation from future climate change, e.g. losses from evaporation due to higher temperatures, impact of higher rainfall, intake/outfall flood risk perspective	Operability	Operational Resilience	Seeking to have the most evolvable option for future needs beyond planning period	Expert judgement	No differentiator across WTW location options. Climate change risks to the WTW would be similar irrespective of the location selected.
OPS7B	Sustainability - Power required for operation	Operability	Operational Resilience	Reducing impact of the overall scheme	Calculated power requirement for the option	No differentiator across WTW location options. At the time of the appraisal (March 2024), there is no information to suggest that there will be any significant difference in power required for operation. This is because the WTW treatment train is being considered would be identical, irrespective of the location selected.
OPS8B	3rd Party Impact - Potential to disrupt existing rail network during operation	Operability	Transport Planning	Reduce impact on stakeholders during operation	Expert judgement	Not applicable. At the time of the appraisal (March 2024), it is established that all transportation requirements for the WTW (construction materials and personnel movement) will be via the road and not the railway. As such, there would be no potential to disrupt rail network.
OPS8C	3rd Party Impact - Option facilitates infrastructure for other modes of transport, including pedestrians, cyclists and other non-motorised users	Operability	Transport Planning	To ensure the best value scheme	Expert judgement. Review GIS for PRoW, cycle routes, etc.	No differentiator across WTW location options. At the time of the appraisal (March 2024), there is no information to suggest that any of the options considered would facilitate infrastructure for other modes of transport.
OPS8D	3rd Party Impact - Congestion at the relevant junctions for all movements, and the effective use of the transport network through innovative solutions	Operability	Transport Planning	Compliance with highways design guidance?	Expert judgement	N/A - No differentiator across WTW location options. Vehicle movements during construction covered by CON3E. During operation, it is not envisaged that the WTW will contribute any significant vehicle movement relative to other activities and normal traffic. Only minimal routine vehicle movement (e.g. for solid waste removal and chemical delivery) would be expected.
OPS8E	3rd Party Impact - Impact on journey time reliability	Operability	Transport Planning	Compliance with highways design guidance?	Expert judgement	N/A - No differentiator across WTW location options. Vehicle movements during construction covered by CON3E. During operation, it is not envisaged that the WTW will contribute any significant vehicle movement relative to other activities and normal traffic. Only minimal routine vehicle movement (e.g. for solid waste removal and chemical delivery) would be expected.
OPS9A	Quality - Impact of reservoir depth and sedimentation on water quality, e.g. stratification, the deeper the better	Operability	Reservoir water quality	Compliance with water company standards	Expert judgement	Reservoir specific criteria - there is no differentiator between the options as this criteria is dependent on the .
COS3	Opportunity for cost-sharing with other SROs, NSIPs and local non-SRO schemes/plans, e.g. STT, T2ST, SWOX/Farmoor, Abingdon flood storage	Cost and Carbon	Cost	Client/project requirement to aid decision making	Cost estimate calculation for each option.	At the time of the appraisal (March 2024), there is no difference between the options regarding the opportunity for cost-sharing with other SROs. The project is to be entirely funded by the T2ST, having synergies with SESRO (WTW sited on the indicative location for SESRO, and raw water feed will be from the SESRO reservoir). There are currently no additional at this stage.
CAR2	Whole Life Carbon Cost (WLC) of the option	Cost and Carbon	Carbon	Client/project and NPS requirement to aid decision making	Carbon estimate calculation for each option.	No data to support this, simple CAPEX approach to be used. At the time of the appraisal (March 2024), there is insufficient data to support a WLC analysis. As such, simple CAPEX approach to be used (See CAR1).

Criteria code	Criteria Description	Theme	Sub-theme	Description of RAG	Method of Assessment	Reason for exclusion
CAR4	Maximise opportunity for achieving carbon net zero, e.g. option minimises energy need and/or facilitates sustainable means of energy production	Cost and Carbon	Carbon	Client/project and NPS requirement to aid decision making	Carbon estimate calculation for each option.	At the time of the appraisal (March 2024), there is no difference between these options regarding the opportunity for achieving carbon net-zero.
ENV6A	Minimise loss of fluvial flood storage within Flood Zone 2 or 3	Environment	Flood Risk	Client/project and NPS requirement - allow continual operation of asset	Measure using GIS	All WTW location options outside flood plain. At the time of the appraisal (March 2024), none of the options selected fall within a flood plain.
ENV6B	Minimise impacts of pluvial flood risk.	Environment	Flood Risk	Client/project and NPS requirement - allow continual operation of asset	Expert judgement	All WTW location options outside flood plain. At the time of the appraisal (March 2024), none of the options selected fall within a flood plain.
ENV14H	Option does not affect Water Framework Directive (WFD) Quality Elements within the 'Sandford Brook (source to Ock)' WFD waterbody (GB106039023410) to a degree that there is a risk of deterioration; or compromise the ability to attain Water Framework Directive objectives	Environment	Aquatic Environment	DUPLICTAE	DUPLICATE	This is a duplicated criterium (covered in ENV14A).
CPC16	Potential for contribution to long-term infrastructure aims	Community & Planning	Consenting	Required to integrate/comply with national plans set out by National Highways as well as local plans set out by OCC and VoWH	Expert judgement	No differentiator across WTW location options. At the time of the appraisal (March 2024), the WTW is not anticipated to provide any additional infrastructure irrespective of the location selected.
CPC17	The option provides economic benefits by directing traffic through local town centres which will boost their footfall and potential for people to stop and utilise their local economy	Community & Planning	Transport Planning	Required to integrate/comply with national plans set out by National Highways as well as local plans set out by OCC and VoWH	Expert judgement	No differentiator across WTW location options. At the time of the appraisal (March 2024), the WTW is not anticipated to impact transport infrastructure or transport planning.
CPC18	Influence the location and layout of development to maximise the use and value of existing and planned sustainable transport investment	Community & Planning	Transport Planning	Required to integrate/comply with national plans set out by National Highways as well as local plans set out by OCC and VoWH	Expert judgement	No differentiator across WTW location options. At the time of the appraisal (March 2024), the WTW is not anticipated to impact transport infrastructure or transport planning.
CPC19	Maximise the benefits of travel for non-motorised users between key destinations	Community & Planning	Transport Planning	Required to integrate/comply with national plans set out by National Highways as well as local plans set out by OCC and VoWH	Expert judgement	No differentiator across WTW location options. At the time of the appraisal (March 2024), the WTW is not anticipated to impact transport infrastructure or transport planning.

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