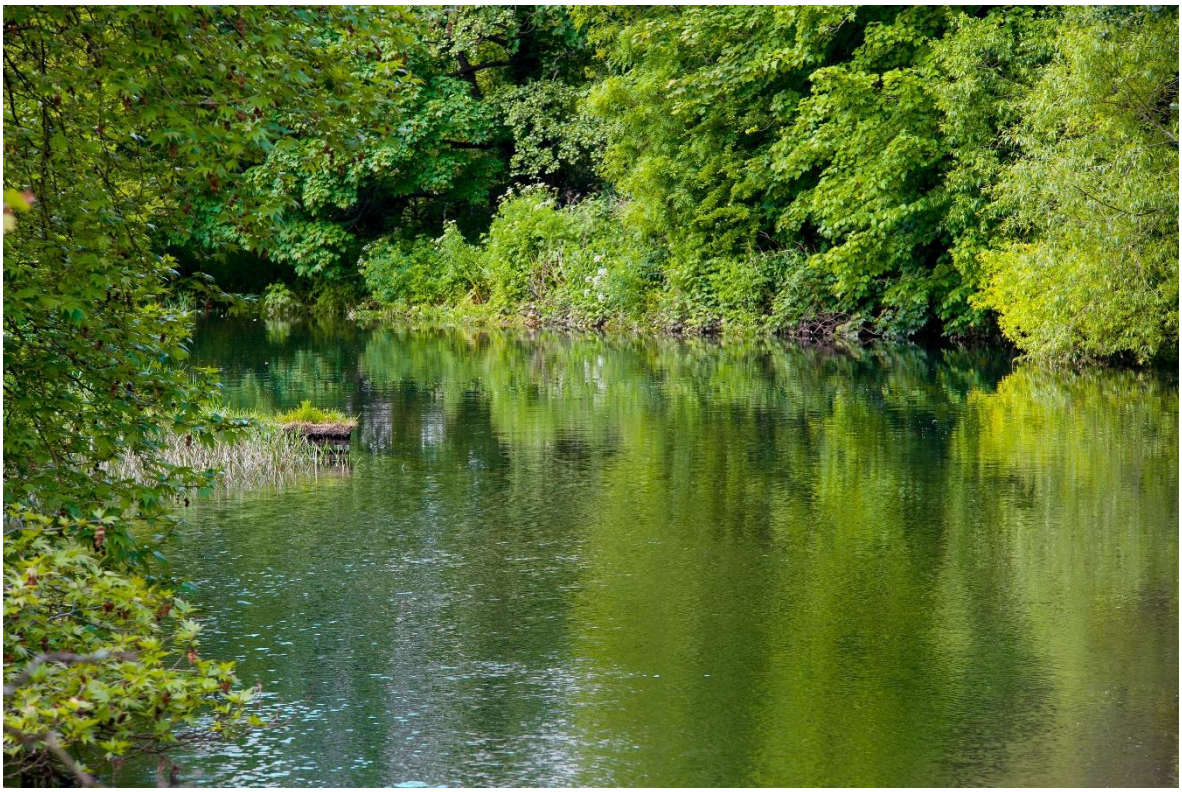
Strategic Regional Water Resource Solutions: Annex B4 Strategic Environmental Assessment (SEA)

Standard Gate Two Submission for Thames to Southern Transfer (T2ST)

Date: November 2022



Notice

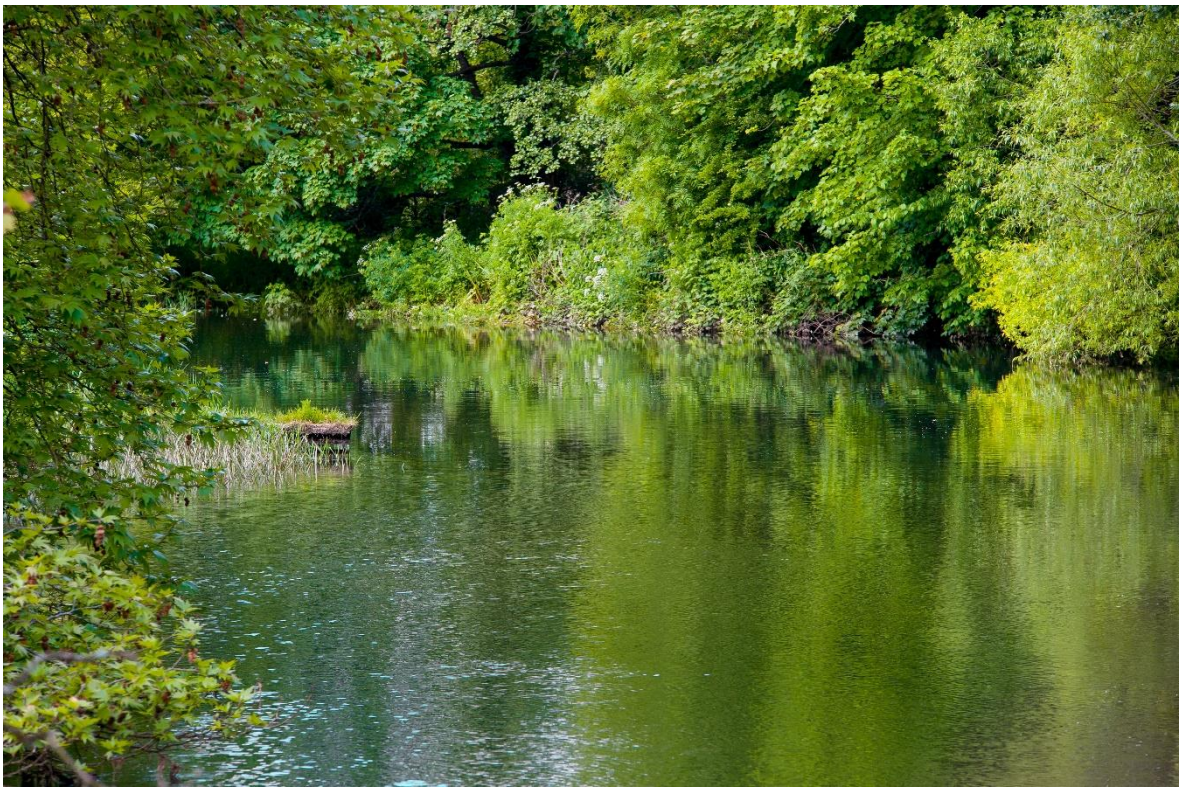
Position Statement

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

Disclaimer

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

November 2022



THAMES TO SOUTHERN TRANSFER (T2ST)

Annex B4 Strategic Environmental Assessment (SEA)

Ref: T2ST-G2-REP-05 (Annex B4) November 2022

Contents

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Glossary

Acronym	Definition
AQMA	Air Quality Management Areas
BPT	Brake Pressure Tank
CTMP	Construction Traffic Management Plan
GWDTE	Groundwater Dependant Terrestrial Ecosystems
EAR	Environmental Assessment Report
HRA	Habitat Regulations Assessment
PS	Pumping Station
RAPID	Regulators' Alliance for Progressing Infrastructure Development
SEA	Strategic Environmental Assessment
SESRO	South East Strategic Reservoir Option
SRO	Strategic Resource Options
SSSI	Site of Special Scientific Interests
STT	Severn To Thames Transfer
T2ST	Thames to Southern Transfer
WRSE	Water Resources South East
WSR	Water Supply Reservoir
WTW	Water Treatment Works

Executive summary

This Strategic Environmental Assessment (SEA) supports the Environmental Assessment Report (EAR) that accompanies the Gate 2 submission to the Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the Thames to Southern Transfer (T2ST). This Annex presents the findings of a SEA applied to the options for the Gate 2 T2ST pipeline route options.

Route and site selection undertaken at Gate 2 has identified two options for the T2ST SRO therefore two route options have been assessed as part of the SEA. The T2ST SRO transfers potable water from a new Water Treatment Works (WTW) at the intake location to the west of A34 near Drayton in Oxfordshire in the Thames Water region to the existing Yew Hill Water Supply Reservoir (WSR) near Winchester in the Southern Water region. These options have been developed based on series of criteria that consider engineering, environmental, social, and planning constraints. The route for each option has been identified within a wider corridor that meets a majority of the criteria and therefore avoids a large number of environmental designations and communities along its route. These options are listed below:

- Option B – Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester); and
- Option C – Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester).

The approach to the SEA is aligned with the Water Resources South East (WRSE) regional plan environmental assessment process as presented in the WRSE SEA Scoping Report (Mott MacDonald, 2020) and Environmental Assessment Methodology Guidance (Revision D). The EAR developed for each option alongside the Habitat Regulations Assessment (HRA) and Water Framework Directive (WFD) assessment have fed into the SEA. The EARs are presented in Annex B1. The HRA and WFD are presented separately in Annex B2 and Annex B3 respectively.

This SEA has involved the identification of potential effects for each SEA objective at both the construction and operational phases, pre and post mitigation, with each SEA objective scored against an eight-point scale. The SEA objectives are presented in the table below.

SEA Topic	SEA Objective
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)
Soil	Protect and enhance the functionality, quantity and quality of soils
Water	Increase resilience and reduce flood risk
	Protect and enhance the quality of the water environment and water resources
	Deliver reliable and resilient water supplies
Air	Reduce and minimise air emissions
Climatic Factors	Reduce embodied and operational carbon emissions
	Reduce vulnerability to climate change risks and hazards
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing

SEA Topic	SEA Objective
	Maintain and enhance tourism and recreation
Material Assets	Minimise resource use and waste production
	Avoid negative effects on built assets and infrastructure

Given both options (Route B and Route C) follow a very similar route, the SEA identified similar effects for each of the SEA objectives with both options scoring the same against each objective.

Major positive effects (pre mitigation and post mitigation) have been identified for both options (Route B and Route C) for the SEA objective on delivering reliable and resilient water supplies given both the options improve the transfer of water across regions. WFD Level 1 Assessments were undertaken for both options (Route B and Route C) and triggered the requirement for WFD Level 2 Assessments. The WFD Level 2 Assessments (see Annex B3) for both options (Route B and Route C) identified that there are potential effects associated with the construction and operational phases, however these effects can be mitigated and further WFD assessment is therefore not required. Minor positive effects (pre mitigation and post mitigation) have been identified for both options (Route B and Route C) in relation to climate resilience given the options contribute to efficient use of water resources, providing protection against future drought scenarios (and potentially avoids abstractions in more vulnerable areas).

Carbon will be generated as a result of construction as well as during operation of both options (Route B and Route C). For both options (Route B and Route C), the SEA identified minor negative effects (pre mitigation and post mitigation) associated with carbon emissions during the construction phase and major negative effects (pre mitigation and post mitigation) during the operational phase.

Major negative effects were identified for biodiversity, flora and fauna (pre-mitigation) as a result of both of the options (Route B and Route C) intersecting international (Natura 2000 sites) and nationally designated sites. Route B is identified to have potential effects on Bere Mill Meadows SSSI whereas Route C does not. Both of the options (Route B and Route C) have the potential to result in impacts on priority habitats and Ancient Woodland. Ancient woodland is classed as ‘irreplaceable habitat’ and both options (Route B and Route C) intersect an area of Ancient Woodland. However, Route C is within close proximity (within 15m) to a greater number of Ancient Woodlands compared to Route B. A HRA Stage 1 Screening and Stage 2 Appropriate Assessment has been undertaken (see Annex B2) which identified that with appropriate mitigation, no likely significant effects are identified for Natura 2000 sites, or the UK National Site Network, for both options (Route B and Route C) alone and in-combination with other projects or plans. The route corridors of both options (Route B and Route C) bisect a Local Wildlife Site and several SSSIs (some of which are Groundwater Dependant Terrestrial Ecosystems (GWDTE)). Therefore, having potential for direct impact from habitat loss and disturbance. Assuming the routes can be re-routed to avoid these sites and the Ancient Woodland then residual effects are likely to be reduced, however moderate effects are identified post mitigation given uncertainty in baseline data and potential mitigation measures required.

The options (Route B and Route C) both pass through the North Wessex Downs AONB and the above ground assets are also located within the AONB, as such moderate negative effects were identified for landscape for the construction and operational phases (pre-mitigation). With careful design and screening residual effects (post mitigation) are likely to be minor. Moderate negative effects were also identified for the construction phase for the SEA objective on soil (pre-mitigation) given both options (Route B and Route C) have the potential for disturbance on agricultural land (Grade 2 – 5) and there is potential for both of the options (Route B and Route C) to disturb contaminants given they intersect or are within close proximity to historic and authorised landfill sites. Cliffeville landfill site is within the option corridor for Route B, however it

is not within Route C. Given that land will be reinstated, soil management procedures are recommended and best practice to reduce contamination risk is recommended, the residual effects (post mitigation) are likely to be minor. The construction phase of both options (Route B and Route C) also have the potential to cause disruption to built assets and infrastructure therefore moderate negative effects are identified pre-mitigation. Use of pipejack or micro tunnel crossings under major roads and motorways and implementation of a Construction Traffic Management Plan (CTMP) will help reduce effects and therefore to minor negative effects are identified for both options (Route B and Route C) post mitigation. Minor negative or neutral effects were identified for the remaining SEA objectives.

Mitigation measures to prevent, reduce or off-set adverse environmental effects have been identified as part of the SEA.

A cumulative effects assessment was undertaken on both route options B and C, as per the cumulative effects assessment methodology. The assessment found that cumulative effects were likely to result during construction from other SROs (South East Strategic Reservoir Option (SESRO) and Severn to Thames Transfer (STT)), but cumulative effects during operation were unlikely. Cumulative effects may result during construction of some projects under Local Development Frameworks and Planning Applications, but cumulative effects during operation were unlikely to occur.

A number of recommendations for further work beyond Gate 2 are suggested.

1 Introduction

1.1 Overview

This Annex supports the Environmental Assessment Report (EAR) that accompanies the Gate 2 submission to the Regulators' Alliance for Progressing Infrastructure Development (RAPID) for the Thames to Southern Transfer (T2ST) Strategic Resource Option (SRO). This Annex presents the findings of a Strategic Environmental Assessment (SEA) applied to Options B and C for the Gate 2 T2ST pipeline route options.

It should be noted that the T2ST SEA is not a formal SEA under The Environmental Assessment of Plans and Programmes Regulations 2004 as it is a project not a plan/programme and is therefore, outside the scope of the SEA Regulations[1]. An SEA level options assessment has been carried out as best practice (referred to in this report as SEA for brevity) and to help inform the regional planning and WRMP24 SEAs. The T2ST SEA Annex B4 document is not an Environmental Report under the Regulations and therefore, does not contain all of the information as set out in Schedule 2. A compliant Environmental Report will be produced for the WRMP24. The SEA process will be undertaken for the WRMPs as is required under the SEA Regulations.

1.2 Gate 2 Thames to Southern Transfer Options

The assessment presented here develops work undertaken at Gate 1. The assessments undertaken at Gate 1 were applied to six options for transferring water between the Thames Water Region and the Southern Water Region.

Route and site selection undertaken at Gate 2 has identified two options for the T2ST SRO, with 3 possible capacities of 50Ml/d, 80Ml/d and 120Ml/d, transferring potable water from land to the west of A34 near Drayton in Oxfordshire in the Thames Water region to the existing Yew Hill Water Supply Reservoir (WSR) near Winchester in the Southern Water region. These options have been developed based on series of criteria that consider engineering, environmental, social, and planning constraints. The route for each option has been identified within a wider corridor that meets a majority of the criteria and therefore the pipeline can avoid a large number of environmental designations and communities along its route. These options are listed below and further detailed in Section 2.

- Option B – Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester); and
- Option C – Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester).

Option C is a variation of option B. The majority of the route is common to both, with the only difference being the central section of the route to the south of Newbury which goes west of the A34 in Option B, and east of the A34 in Option C.

Full details of the route and site selection undertaken at Gate 2 is included in the Route and Site Selection Annex A2, which also details the discounted options.

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

1.3 Methodology

This document presents the SEA of the T2ST options.

The SEA has been undertaken in-line with the environmental assessment methodology developed as part of the WRSE regional plan process as presented in the WRSE SEA Scoping Report (Mott MacDonald, 2020) and Environmental Assessment Methodology Guidance (Revision D). The T2ST options were initially assessed as part of the environmental assessment of the WRSE regional plan and have also been assessed as part of the Gate 1 process. However, following Gate 1, the options have been developed further and the SEA has therefore been updated to reflect the most up to date options.

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

The EAR, the Habitat Regulations Assessments (HRA), Invasive Non-Native Species (INNS) and Water Framework Directive (WFD) Assessments have also informed the SEA. The EAR is presented in Annex B1 and the HRA and WFD can be found in Annex B2 and Annex B3 respectively. Natural Capital and Biodiversity Net Gain (BNG) assessments have also been undertaken as outlined within the EAR. However, the results are not considered within the SEA and therefore do not contribute to the scoring at this stage as they will be considered in parallel/alongside the SEA metrics in the Regional Plan and WRMP plan decision making processor.

A cumulative assessment with other water company capital investments or third-party development plans or projects has been undertaken and is presented in Section 6. The cumulative effects assessment has been undertaken as per the cumulative effects assessment methodology (version 2, 28 March 2022, Mott MacDonald).

In all cases, the findings presented in this document follow the methodologies above and the principles of SEA.

Table 1.1: Scoring key

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

1.4 Assumptions and limitations

This assessment has been undertaken assuming the maximum transfer capacity of 120Ml/d.

Mott MacDonald has relied on published data and information provided by Thames Water and Southern Water, and from third party organisations in the production of this SEA. The baseline information on the GIS database used to identify potential effects in this SEA is considered correct at the time of assessment (March 2022). It is possible that conditions described in this report may change over time Changes since the date of assessment, such as additional

designated sites, will be taken into account in future assessments. The GIS database is an ESRI tool that uses open-source datasets from Natural England, the Environment Agency, Historic England and other sources. The full list of environmental data layers used is provided in the WRSE SEA Scoping Report (Mott MacDonald, 2020) and Environmental Assessment Methodology Guidance (Revision D).

The SEA has also used information collated as part of the EAR to provide additional site-specific information. However, this information was undertaken as a desk-based assessment only. Site surveys and investigations will be scoped and undertaken beyond Gate 2 to provide more detailed baseline information in order to better determine effects and mitigation measures required. A list of recommended surveys is provided in the EAR, Section 4.15 ‘Next Steps’.

The mitigation measures identified as part of the SEA (Chapter 5) are currently indicative at this stage given the current stage of the option development. It is recommended that these are taken forward, however these will be confirmed as the design develops throughout the sequent option development stages.

2 Summary scheme description

2.1 Overview

The T2ST route begins at a new WTW at the intake location to be located on existing agricultural land to the west of A34 near Drayton in Oxfordshire in the Thames Water region and ends at the existing Yew Hill WSR near Winchester in the Southern Water region. The transfer scheme has 3 possible capacities of 50Ml/d, 80Ml/d and 120Ml/d and includes a number of intermediate break pressure tanks and pumping stations to allow hydraulic transfer of the water between the new WTW at the intake location and Yew Hill WSR. In practice T2ST will either be supplied by either the Severn to Thames Transfer SRO (STT) or the South East Strategic Reservoir Option (SESRO).

A full scheme description can be found in the RAPID Gate 2 Report and in Annex A3 the Concept Design Report, however a summary of the main aspects of the options are included below.

The transfer route between the new WTW at the intake location and Yew Hill WSR is approximately 80-85km in length.

The majority of the pipeline installed will be 1000 to 1100mm diameter at maximum capacity of 120Ml/d which will be installed primarily using open cut excavation. The pipeline route passes predominantly through open rural countryside, crossing a number of roads, rivers and railways. To provide sufficient working space to construct the pipeline a temporary working easement will be required, typically up to 40m wide depending on the final design depth of the pipeline. During construction the topsoil within the easement would be stripped back and stored locally within the easement, followed by excavation of the pipe trench which would be approximately 1.8m wide x 2.2m deep, to allow minimum cover of 900mm above the pipe and 300mm pipe bedding under the pipeline, for a 1000mm diameter pipeline.

Smaller diameter connection pipelines are also required in two locations, to the existing water supply network at Beacon Hill WSR and Micheldever WSR, as detailed in the sections below.

There are expected to be several major road, rail and river crossings located along the preliminary pipeline routes which are anticipated to require trenchless technology. Through consultation with Thames Water and Southern Water it has been assumed at concept design stage that all expected trenchless crossings will comprise a single tunnelled crossing, using pipe jacking and micro tunnelling. Launch and reception shafts would be constructed either side of the surface feature and a concrete tunnel section then constructed between the two shafts.

Pipejack or micro tunnel crossings will be required to cross existing railways, motorways, A roads and B Roads. Other minor road crossings will be installed using open cut methods and temporary road closure.

Pipejack or micro tunnel crossings will also be required to cross main watercourses. Crossings for ordinary watercourses will be installed using open cut methods and temporary culverts.

Full details of the crossings lengths and locations can be found in Annex A3, the Concept Design Report.

There are two options within the T2ST SRO for transferring water from the new WTW site at the intake location to the west of A34 near Drayton to the existing Yew Hill WSR near Winchester as described below:

- Option B - Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester), with a total pipeline length including spur connections of 93.8km; and
- Option C - Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester), with a total pipeline length including spur connections of 94.2km.

Option C is a variation of option B. The majority of the route is common to both, with the only difference being the central section of the route to the south of Newbury which goes west of the A34 in Option B, and east of the A34 in Option C.

A schematic of the Options B and C is provided in Figure 2.1 which shows indicative locations for the WTW, pipe route corridors and connection points to the existing water network.

Figure 2.1: Schematic of preferred T2ST options B and C

Each route can be split into 4 sections as discussed in the below sections.

2.2 Option B - Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester)

2.2.1 Option B Section 1 – Water Treatment Works to BS3

This section is approximately 18.0km in length.

2no. Pipe jack crossings will be required along this section including the Didcot to Swindon railway line and the A417. The following above ground assets are located within this section:

- BS1 Water Treatment Works (WTW) and Pumping Station (PS) - 120Ml/d, approx. land area 300m x 150m;
- BS2 Break Pressure Tank (BPT) – 5Ml/d, approx. land area 75 x 55m; and
- BS3 PS and BPT - 5Ml/d, approx. land area 80 x 80m.

2.2.2 Option B Section 2 – BS3 to north of the River Enbourne

This section is approximately 19.6km in length.

8no. Pipe jack crossings will be required along this section including B4494, M4, Winterbourne Road, River Lambourn, B4000, A4, Wick Wood, and River Kennet & Newbury railway line (including the Kennet and Avon Canal). There are no above ground assets required within this section.

2.2.3 Option B Section 3 – River Enbourne, west of the A34 to River Test

This section is approximately 32.1km in length.

The route includes a 250mm diameter pipeline connection to an existing tank at Beacon Hill, approximately 1.8km in length.

The route also includes a 700mm diameter pipeline connection to the existing Micheldever WSR, approximately 7km in length.

9no. Pipe jack crossings will be required along this section including River Enbourne, A343, Bourne Rivulet/B3048, Andover railway line, B3400, A303 (1), A303 (2), B3048 and the River Test.

The following assets are located within this section:

- BS4 PS and BPT – Options 1, 2 and 3 (only one location required, but currently reviewing 3 options) – 5Ml/d, approx. land area 80 x 80m;
- BS5 BPT – 5Ml/d, approx. land area 75 x 55m;
- Beacon Hill WSR – existing asset, not part of this assessment;
- Micheldever WSR - existing asset, not part of this assessment; and
- BS6 PS, approx. size 65 x 40m.

2.2.4 Option B Section 4 – River Test to Yew Hill WSR

This section is approximately 24.1km in length.

6no. Pipe jack crossings will be required along this section including A303, River Dever, A30, A272, B3049, and A3090.

The route includes a connection to the existing Crabwood WSR.

The route ends with a connection to the existing Yew Hill WSR.

There are no above ground assets proposed for this section.

2.2.5 Option B summary

Table 2.1 summarises the proposed works for Option B.

Table 2.1: Option B scheme description summary

Section	Pipe length	New assets	Trenchless crossings of natural features
Section 1 – Water Treatment Works to BS3	18.0km	BS1 WTW and PS BS2 BPT BS3 PS and BPT	None
Section 2 –BS3 to north of the River Enbourne	19.6km	None	River Lambourn Wick Wood River Kennet
Section 3 – River Enbourne, west of A34 to River Test	32.1km	BS4 PS and BPT BS5 BPT BS6 PS	River Enbourne Bourne Rivulet River Test
Section 4 – River Test to Yew Hill WSR	24.1km	None	River Dever

2.3 Option C - Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester)

2.3.1 Option C Section 1 –Water Treatment Works to CS3

As per option B.

This section is approximately 18.0km in length.

2no. Pipe jack crossings will be required along this section including the Didcot to Swindon railway line and the A417.

The following assets are located within this section:

- CS1 WTW and PS - 120Ml/d, approx. land area 300m x 150m;
- CS2 BPT – 5Ml/d, approx. land area 75 x 55m; and
- CS3 PS and BPT - 5Ml/d, approx. land area 80 x 80m.

2.3.2 Option C Section 2 – CS3 to north of the River Enbourne

As per option B.

This section is approximately 19.6km in length.

8no. Pipe jack crossings will be required along this section including B4494, M4, Winterbourne Road, River Lambourn, B4000, A4, Wick Wood, and River Kennet & Newbury railway line (including the Kennet and Avon Canal).

There are no above ground assets required within this section.

2.3.3 Option C Section 3 – River Enbourne, east of the A34 to River Test

This section is approximately 32.5km in length.

The route includes a 250mm diameter pipeline connection to an existing tank at Beacon Hill, approximately 4.2km in length.

The route also includes a 700mm diameter pipeline connection to the existing Micheldever WSR, approximately 9.2km in length.

15No. Pipe jack or micro tunnel crossings will be required along this section including, River Enbourne, A34 (1), A343, Penwood Road, Woodland (1), Hopping Common and B4640,

Woodland (2), A34 (2), Whitchurch railway line, B3400, River Test (1), A34 (3), River Test (2), B3048, A303 (1), A303 (2).

The following assets are located within this section:

- CS4 PS and BPT – 5Ml/d, approx. land area 80 x 80m;
- Beacon Hill WSR – existing asset, not part of this assessment;
- Micheldever WSR - existing asset, not part of this assessment; and
- CS5 PS, approx. land area 65 x 40m.

2.3.4 Option C Section 4 – River Test to Yew Hill WSR

As per option B.

This section is approximately 24.1km in length.

6no. Pipe jack crossings will be required along this section including A303, River Dever, A30, A272, B3049, and A3090.

The route includes a connection to the existing Crabwood WSR.

The route ends with a connection to the existing Yew Hill WSR.

There are no above ground assets proposed for this section.

2.3.5 Option C summary

Table 2.1 summarises the proposed works for Option C.

Table 2.2: Option C scheme description summary

Section	Pipe length	New assets	Trenchless crossings of natural features
Section 1 – Water Treatment Works to CS3	18.0km	CS1 WTW and PS CS2 BPT CS3 PS and BPT	None
Section 2 – CS3 to River Enbourne	19.6km	None	River Lambourn Wick Wood River Kennet
Section 3 – River Enbourne, east of the A34 to River Test	32.5km	CS4 PS and BPT CS5 PS	River Enbourne Woodland and Hopping Common Woodland (west of Burghclere) River Test (two crossings required)
Section 4 – River Test to Yew Hill WSR	24.1km	None	River Dever

2.4 Asset description

The below sections describe the new assets to be installed as part of the SRO and list the equipment expected to be associated with them.

2.4.1 BS1/CS1 WTW and PS

The WTW is to be located at the north end of both corridor options B and C. Raw water will enter the screening and treatment processing before entering the option pipelines. The waste

water by-product of the treatment process will be sent for treatment to a local sewage treatment works. The WTW has approximately a 45,000m^2 area and will contain the following equipment

- Waste and sludge handling
- Ozone contact tanks
- Granular Activated Carbon (GAC) Plant
- UV plant
- Rapid Gravity Filter (RGF) plant
- Chlorine contact tank
- Dissolved Air Flotation (DAF) plant
- Flocculation tank
- Welfare
- Chemical storage
- Treated water storage
- Pumping station

It should be noted that at the time of writing no formal plans of the WTW has been issued. It is unknown at this point where equipment will be located on the site. An area has been identified with an approximate boundary for the location of the WTW and will be assessed against flood risk and other environmental impacts.

2.4.2 BS2/CS2 BPT, BS5 BPT

The area size of the BPT is approximately 4125m^2 and only includes a 5MI storage tank and access roads.

2.4.3 BS3/CS3 PS and BPT, BS4 PS and BPT and CS4 PS and BPT

For each of the PS and BPT assets, the PS and BPT are located on one site with area size approximately 6400m^2 and includes the following equipment:

- HV/LV transformer x2
- Surge tanks
- Standby generator
- Pumping station
- 5Ml Storage tanks

2.4.4 BS6/CS5 PS

The PS area size is approximately 2600m^2 and includes the following equipment.

- HV/LV transformer
- Surge tanks
- Standby generator
- Pumping station

2.5 Programme assumptions

The draft Water Resources South East (WRSE) regional plan sets out the overall need for T2ST and this feeds into the relevant Water Resource Management Plans (WRMPs) from both Thames Water and Southern Water. The draft WRSE regional plan has determined a need for a T2ST scheme of up to 120Ml/d by 2040-2053 depending on the scenario in the adaptive plan. Therefore, at this stage, it is envisaged the project will not be operational until at least 2040.

3 SEA assessment for Option B

3.1 Assessment

This section summarises the SEA outputs for Option B – Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester).

Table 3.1 presents the scores for construction and operation phases against each of the SEA objectives split into positive and negative effects as outlined in the methodology. The scores are presented for pre-mitigation (before any mitigation is applied) and post-mitigation (after mitigation is applied, 'residual effects'). The full appraisal tables are presented in Appendix A.

The applicable mitigation for each SEA objective is described in Section 5.

Table 3.1: Summary of SEA for Option B

SEA Topic	SEA Objective	Pre-mitigation				Residual			
		Construction		Operation		Construction		Operation	
		+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	-	0	--	0	0
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	0	-	0	0
Water	Increase resilience and reduce flood risk	0	--	0	--	0	-	0	-
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	0	0	+++	0
Air	Reduce and minimise air emissions	0	-	0	0	0	-	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	0	---	0	-	0	---
	Reduce vulnerability to climate change risks and hazards	0	0	+	0	0	0	+	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	--	0	--	0	-	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	-	0	-	0	-

SEA Topic	SEA Objective	Pre-mitigation				Residual			
		Construction		Operation		Construction		Operation	
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0
Material Assets	Minimise resource use and waste production	0	-	0	0	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0

3.2 Key benefits and impacts of Option B

A summary of the benefits and adverse impacts of Option B as identified in the SEA is included in Table 3.2. It should be noted that the EAR (Annex B1) and the other assessments such as the Natural Capital and Biodiversity Net Gain Assessment set out opportunities and wider benefits in addition to those in Table 3.2. They have not been included in the SEA as it is currently unclear whether they would be taken forward and further investigation to develop these opportunities is proposed beyond Gate 2.

Table 3.2: Summary of the benefits and adverse impacts of Option B

Topic	Benefit	Adverse
Biodiversity, flora and fauna	None identified.	The pipeline will cross SSSI, SACs and LNRs. As such, there is potential for direct effects on these sites during the construction phase. The pipeline also crosses Priority Habitats, passes through an area of Ancient Woodland and areas of woodland therefore potential for loss or disturbance during the construction phase. The water to be transferred is proposed to be of potable standard, and therefore any potential leaks are unlikely to lead to transfer of INNS to sensitive habitats within, or hydrologically connected to, the pipeline route.
Soil	None identified	The pipeline route passes through historic and authorised landfill sites, including Cliffeville Landfill which is within the option corridor, and there are also additional sites within proximity to the route. There is potential that the construction phase could disturb contaminants.
Water	The scheme will improve water transfer across regions, improving water resource management and resilience of supply.	The pipeline route is predominately within Flood Zone 1, however it does pass through areas of Flood Zone 2 and 3. The new WTW is located within Flood Zone 3. There may be some risk of flooding during the construction and operational phases as a result. The option crosses several waterbodies, including main rivers and chalk rivers, SPZ's and WFD Groundwater bodies and during the construction phase there is potential for these water sources to be impacted. Further hydrological assessment is required for works within SPZ1 or 2. The WFD Level 2 Assessment identified that there are potential construction and operation effects for one waterbody, however it is identified that these effects can be mitigated and further WFD assessment is therefore not required.
Air Quality	None identified	The construction phase will likely result in minor effects on local air quality.
Climatic Factors	The SRO contributes to efficient use of water resources, providing protection against future drought scenarios (and potentially	Carbon will be generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation (e.g. pumping stations). The relative carbon scale identified that Option B has minor construction and major operation carbon emissions (relative to other WRSE Regional Plan options).

Topic	Benefit	Adverse
	avoids abstractions in more vulnerable areas).	
Landscape	None identified	There will be above ground infrastructure which will lead to a permanent change in the landscape. There are three assets which are located within the AONB. As such, there may be permanent changes to the landscape as a result of the scheme.
Historic Environment	None identified	The pipeline passes through Conservation Areas and there are numerous Listed Buildings within 500m of the pipeline route. The pipeline route is also within 500m of Scheduled Monuments, Conservation Areas, Registered Parks and Gardens and a Registered Battlefield. There is potential that the construction phase will result in disturbance effects to the setting of these assets. The above ground infrastructure is not identified to have any impacts on historic environment assets. There is potential for excavation to impact buried archaeology if present.
Population and Human Health	None identified	There are various community facilities within 500m of the pipeline route. There is potential for disturbance to the local community and users of these community facilities during the construction phase. There are various recreational facilities within 500m of the pipeline route. The pipeline intersects a National Trail and National Cycle Routes. Public rights of way are also intersected by the pipeline route.
Material Assets	None identified	The pipeline intersects railway lines, major roads, National Trail and National Cycle Routes. There is potential for disruption to these during the construction phase. The pipeline construction will require materials and resource use.

4 SEA assessment for Option C

4.1 Assessment

This section summarises the SEA outputs for Option C – Central route via Newbury (West of Newbury and then crossing to the east of the A34, to Winchester).

Table 4.1 presents the scores for construction and operation phases against each of the SEA objectives split into positive and negative effects as outlined in the methodology. The scores are presented for pre-mitigation (before any mitigation is applied) and post-mitigation (after mitigation is applied, 'residual effects'). The full appraisal tables presented in Appendix A.

The applicable mitigation for each SEA objective is described in the following sections.

Table 4.1: Summary of SEA for Option C

SEA Topic	SEA Objective	Pre-mitigation				Residual			
		Construction		Operation		Construction		Operation	
		+ve	-ve	+ve	-ve	+ve	-ve	+ve	-ve
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	-	0	--	0	0
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	0	-	0	0
Water	Increase resilience and reduce flood risk	0	--	0	--	0	-	0	-
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	0	0	+++	0
Air	Reduce and minimise air emissions	0	-	0	0	0	-	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	0	---	0	-	0	---
	Reduce vulnerability to climate change risks and hazards	0	0	+	0	0	0	+	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	--	0	--	0	-	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	0	-	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	-	0	-	0	-

SEA Topic	SEA Objective	Pre-mitigation				Residual			
		Construction		Operation		Construction		Operation	
	Maintain and enhance tourism and recreation	0	-	0	0	0	-	0	0
Material Assets	Minimise resource use and waste production	0	-	0	0	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	0	-	0	0

4.2 Key benefits and impacts of Option C

A summary of the key potential benefits and adverse impacts of Option C as identified in the SEA is included in Table 4.2. It should be noted that the EAR (Annex B1) and the other assessments such as the Natural Capital and Biodiversity Net Gain Assessment set out opportunities and wider benefits in addition to those in Table 4.2. They have not been included in the SEA as it is currently unclear whether they would be taken forward and further investigation to develop these opportunities is proposed beyond Gate 2.

Table 4.2: Summary of the key potential benefits and adverse impacts of Option C

Topic	Benefit	Adverse
Biodiversity, flora and fauna	None identified.	The pipeline will cross SSSI, SACs and LNRs. As such, there is potential for direct effects on these sites during the construction phase. The pipeline also crosses Priority Habitats, passes through an area of Ancient Woodland and areas of woodland therefore potential for loss or disturbance during the construction phase. The water to be transferred is proposed to be of potable standard, and therefore any potential leaks are unlikely to lead to transfer of INNS to sensitive habitats within, or hydrologically connected to, the pipeline route.
Soil	None identified	The pipeline route passes through historic landfill sites and there are also additional sites within proximity to the route. There is potential that the construction phase could disturb contaminants.
Water	The scheme will improve water transfer across regions, improving water resource management and resilience of supply.	The pipeline route is predominately within Flood Zone 1, however it does pass through areas of Flood Zone 2 and 3. The new WTW is located within Flood Zone 3. There may be some risk of flooding during the construction and operational phases as a result. The option crosses several waterbodies, including main rivers and chalk rivers, SPZ's and WFD Groundwater bodies and during the construction phase there is potential for these water sources to be impacted. Further hydrological assessment is required for works within SPZ1 or 2. The WFD Level 2 Assessment identified that there are potential construction and operation effects for one waterbody, however it is identified that these effects can be mitigated and further WFD assessment is therefore not required.
Air Quality	None identified	The construction phase will likely result in minor effects on local air quality.
Climatic Factors	The SRO contributes to efficient use of water resources, providing protection against future drought scenarios (and potentially avoids abstractions in more vulnerable areas).	Carbon will be generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation (e.g. pumping stations). The relative carbon scale identified that Option C has minor construction and major operation carbon emissions (relative to other WRSE Regional Plan options).

Topic	Benefit	Adverse
Landscape	None identified	There will be above ground infrastructure which will lead to a permanent change in the landscape. There are three assets which are located within the AONB. As such, there may be permanent changes to the landscape as a result of the scheme.
Historic Environment	None identified	The pipeline passes through Conservation Areas and there are numerous Listed Buildings within 500m of the pipeline route. The pipeline route is also within 500m of Scheduled Monuments, Conservation Areas, Registered Parks and Gardens and a Registered Battlefield. There is potential that the construction phase will result in disturbance effects to the setting of these assets. The above ground infrastructure is not identified to have any impacts on historic environment assets. There is potential for excavation to impact buried archaeology if present.
Population and Human Health	None identified	There are various community facilities within 500m of the pipeline route. There is potential for disturbance to the local community and users of these community facilities during the construction phase. There are various recreational facilities within 500m of the pipeline route. The pipeline intersects a National Trail and National Cycle Routes. Public rights of way are also intersected by the pipeline route.
Material Assets	None identified	The pipeline intersects railway lines, major roads, National Trail and National Cycle Routes. There is potential for disruption to these during the construction phase. The pipeline construction will require materials and resource use.

5 Mitigation

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

Mitigation measures have been identified through the SEA and HRA processes and the topic-based assessments in the EAR (Annex B1). A summary of the proposed general mitigation identified in the SEA is identified below with further detail presented in Appendix A. It should be noted that these mitigation measures are indicative at this stage and will be confirmed as the design develops.

Although these measures do not always completely eliminate effects or result in the downgrading of effects, from moderate to minor for example, they do contribute to reducing the effects identified for the SEA objective. For mitigation required in relation to Natura 2000 and UK National Site Network effects, please refer to the HRA in Annex B2. For further topic-specific mitigation please refer to the EAR (Annex B1).

Proposed general mitigation measures include:

- Biodiversity, flora and fauna:
  - Avoid designated sites by re-routing the pipeline where possible.
  - Implement best practice construction methods to minimise disturbance effects and habitat loss. Habitat is to be reinstated on completion, or if unavoidable, compensatory habitat to be considered to replace damaged or lost habitat.
  - Undertake ecology surveys to inform future design.
  - Implement mitigation as set out in the informal HRA (Annex B2).
  - Investigate opportunities for nature based solutions and BNG such as creation of high value habitat, habitat creation or improvement works within habitat network zones to support nature recovery network and create wildlife corridors.
- Soil:
  - Reinstate disturbed ground, returning it to its original state, following construction.
  - Re-route the pipeline to avoid landfill sites.
  - Implement best practice construction techniques when working within or within close proximity to historic or authorised landfill sites to prevent potential disturbance of contaminants.
  - Undertake further assessment of the landfill with a possible requirement for a Phase 1 contaminated land desk study and implementation of appropriate mitigation actions as identified.
- Water:
  - Implement measures to reduce the potential effects of flooding on the construction and operational phase.
  - Implement pollution prevention and control measures to reduce likelihood of contamination of the water environment during construction (such as interception ditches and/or silt mats).
  - Utilise pipejack or micro tunnel crossings where possible.
  - Undertake further hydrological assessments for works within SPZ1 and SPZ2, and implement appropriate mitigation as required.

- Air:
  - Implement best practice construction methods, such as switch off policies and damping, to reduce effects on air quality.
- Climatic Factors:
  - Consider materials with lower embodied carbon and optimise the pipeline design.
  - Investigate use of renewable or ‘clean’ energy sources for any options which have high energy demands.
- Landscape
  - Implement best practice construction methods, such as screening, to minimise visual disturbance and also implement screening to reduce visual effects of above ground permanent infrastructure.
  - Reinstate land to original state following the construction phase.
- Historic Environment:
  - Implement best practice construction methods to minimise effects on the setting of nearby historic assets.
  - Depending on the presence of archaeology, further survey work and an Archaeological Watching Brief may be required.
- Population and human health:
  - Implement best practice construction methods, such as noise and vibration reduction, selection of appropriate working hours, to reduce effects on the local community.
  - Consider appropriate diversions where public rights of way are affected during construction.
- Material assets:
  - Implement sustainable design measures to reduce resource use and waste.
  - Source materials locally where possible.
  - Utilise pipejack or micro tunnel crossings where possible to minimise disruption to built assets and infrastructure.
  - Implement a Construction Traffic Management Plan (CTMP) to minimise traffic related disruption during the construction phase.

6 Cumulative assessment

6.1 Introduction

A full cumulative effects assessment, as would be reported in an EIA, is not appropriate for Gate 2 due to the conceptual design stage of the T2ST SRO, and other SROs. As such, the focus of this cumulative assessment has been on the identification of risks due to potential cumulative effects of SROs with other plans and projects that will need to be addressed at future gates and for which additional mitigation may be required.

An initial cumulative effects assessment has been undertaken as part of the SEA option update for the T2S2 Gate 2 submission. It is understood that if T2ST is selected as an option in the WRSE Regional Plan as well as Thames Water WRMP24 and Southern Water WRMP24 it will be subject to further cumulative effects assessment with the other selected options, neighbouring water companies plans and neighbouring regional plans. Until the WRSE Best Value Regional Plan has been developed and agreed it is not known when the T2ST option would be implemented, and therefore, which other developments could result in cumulative effects with it.

This cumulative effects assessment has been undertaken as per the cumulative effects assessment methodology.

The following plans, programmes and projects have been considered within this cumulative effects assessment:

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

It should be noted that the cumulative effects assessment applies to both route options B and C and effects are anticipated to be similar. Therefore, the assessment below covers both routes.

Due to uncertainties in design, planning and operation of the schemes reported in this cumulative assessment, an in-combination assessment of all identified plans, programmes and projects is not appropriate for this stage of assessment and will need to be addressed at future gates and for which additional mitigation may be required. It is expected that an in-combination assessment of SROs will be undertaken at a regional scale by WRSE.

As per the programme assumptions in Section 2, the draft WRSE regional plan has determined a need for a T2ST scheme of up to 120Ml/d by 2040-2053 depending on the scenario in the adaptive plan. Therefore, at this stage, it is envisaged the project will not be operational until at least 2040.

6.2 Strategic Resource Options

6.2.1 SESRO

SESRO is a proposed new reservoir to be located between Abingdon, Steventon and East Hanney in Oxfordshire covering an area of up to approximately 7km^2. It is currently scheduled to have an earliest operational date of 2038. If constructed, the T2ST SRO will transfer water from the new SESRO site to the existing Yew Hill WSR. There is the potential for cumulative

construction effects if the schemes are constructed together, effects would arise from construction traffic, noise, dust and visual intrusion. Potential receptors include; Frilford Heath, Ponds & Fens (Sites of Special Scientific Interest (SSSI)), Cothill Fen (SSSI), Barrow Farm Fen (SSSI), Abingdon Air Quality Management Areas (AQMA), A34, A415, Drayton residential areas. Given that the two SROs are connected there are unlikely to be cumulative operational effects as T2ST is transferring the water from SESRO around the network. However, effects will be further investigated beyond Gate 2 and within the WRSE regional planning work.

6.2.2 Severn to Thames Transfer

STT is a proposed new water transfer pipeline which enables the transfer of raw water from the River Severn to the River Thames. It is currently scheduled to have an earliest operational date of 2033. If constructed, the T2ST SRO will connect to the STT system and transfer water to the existing Yew Hill WSR. There is the potential for cumulative construction effects if the schemes are constructed together, effects would arise from construction traffic, noise, dust and visual intrusion. Potential receptors include; Abingdon AQMA, Marcham AQMA, Barrow Farm Fen SSSI, and Frilford Heath, Ponds and Fens SSSI. Given that the two SROs are connected there are unlikely to be cumulative operational effects as T2ST is transferring the water from STT around the network. However, effects will be further investigated beyond Gate 2 and within the WRSE regional planning work.

6.3 Other Water Company Schemes

6.3.1 Southampton Link Main and Andover Link Main schemes (Southern Water)

This scheme is a new bi-directional pipeline between Testwood, Otterbourne and Andover to allow water to be shared across the network. The route has not been finalised, however, works should be completed by March 2027, consistent with the programme agreed in the Section 20 Agreement following the Test and Itchen Licence Inquiry. Therefore, no cumulative effects arising from construction are anticipated due to the timeline for construction being prior to T2ST. Operational cumulative effects will be considered within the Southern Water WRMP24.

6.4 Local Development Frameworks

6.4.1 Winchester City Council

Winchester District Local Plan Part 1 – Joint Core Strategy Policy WT2 - Strategic Housing Allocation – North Winchester: There is Strategic Housing Allocation Land at Barton Farm, Winchester, approx. 1.5km to the east of the proposed route corridors for B and C which has been allocated for the development of about 2,000 dwellings, this is likely to be completed by 2040. There is a potential overlap if T2ST was constructed before 2040 (Scenario 1). There is the potential for minor construction effects arising from noise, dust pollution and disruption to traffic. Potential receptors include; Winchester Town AQMA, Abbots Barton residential areas, Harestock Primary School, The Henry Baurfort Primary School. No operational cumulative effects are anticipated.

Winchester District Local Plan Part 1 – Joint Core Strategy Policy WT3 - Bushfield Camp Employment Site: Land at Bushfield Camp, Winchester is allocated as a 20ha Employment Site, and is located 50m to the North of the proposed route corridors for B and C. The local plan period is up to 2031 but it is not clear when this land would be developed and whether it would also be allocated post-2031 (if not fully developed). Therefore, there is potential for overlap with the T2ST option. If construction periods overlap then there is the potential for minor construction effects arising from noise, dust pollution and disruption to traffic. Potential receptors include; St Cross residential areas, Oliver Battery Primary School, South Winchester Golf Course. No operational cumulative effects are anticipated.

6.4.2 Vale of White Horse District Council

Local Plan 2031 Part 2 Core Policy 15b: Harwell Campus - Harwell Campus Comprehensive Development Framework: Land has been made available at Harwell Campus for research, innovation and economic development to accommodate at least 3,500 net additional jobs. This land is approximately 1km to the east of the proposed route corridors for B and C and within the boundary of the existing campus site. Plans for Harwell expect it to be completed by 2031, therefore, there is a potential overlap if T2ST is constructed in the early 2030s. There is the potential for minor temporary cumulative effects including noise, dust pollution and disruption to traffic, visual intrusion. Potential receptors include; North Wessex Downs ANOB, Chiltern residential areas, Chiltern Primary School. No operational cumulative effects are anticipated.

6.4.3 Test Valley Borough Council

A site has been made available for development immediately adjacent to the proposed route corridors for B and C at Micheldever Road (SHELLA Ref 247). The land could be developed to contain up to 1,100 dwellings. The land is not currently allocated in the Local Plan but is being promoted for residential development by the landowners. No current planning applications associated with this site are in process. However, the Strategic Housing and Economic Land Availability Assessment (SHELAA) indicates that if development takes place, it could extend over 15 years. There is the potential for cumulative effects during construction including noise, dust pollution and disruption to traffic. Potential receptors include; A34, Micheldever residential, Stoke Charity residential, Sutton Scotney residential. As the sites are next to each other it would need to be ensured that one development does not infringe on the other. Potential opportunities exist for re-use of excavated materials for landscaping and other uses between the two projects. No operational cumulative effects are anticipated.

6.5 Planning Applications

Vale of White Horse District Council (planning application: P22/V0599/O): There is an outline planning application (with all matters reserved) for the demolition of existing buildings and the redevelopment of the site at Harwell to provide up to 35,741 sqm of Class E(g) employment floorspace, including office, research and development and laboratory, with associated car parking and landscaping. This application was submitted as part of the Harwell Campus development mentioned above and it approximately 1km east of the proposed route corridors for B and C. Rowstock Noise action planning area is located between the T2ST pipeline route and P22/V0599/O site. There is the potential for cumulative effects during construction on the A4185, resulting from congestion if construction timings were to coincide. However, it is likely that construction will be completed before construction of T2ST. No operational cumulative effects are anticipated.

6.6 Summary

The cumulative assessment has considered the potential cumulative effects of both options (Route B and C) with other SROs, water company schemes, local development frameworks and planning applications. A full cumulative effects assessment, as would be reported in an EIA, is not appropriate for Gate 2 due to the conceptual design stage of the T2ST SRO.

It was identified that T2ST has the potential to result in cumulative effects with other SROs, local development frameworks and planning applications during the construction phase (prior to 2035 or 2049 depending on which scenario goes forward following the WRSE emerging plan). These effects were identified given there is potential for the timing of the construction phases of T2ST to overlap with the construction phase of these other plans, programmes and projects. No operational cumulative effects were identified. T2ST is not identified to have any construction or operational related cumulative effects with other water company schemes.

The HRA Appropriate Assessment identified that no adverse effects resulting from the implementation of Option B (alone and in-combination with other projects or plans), or Option C (alone and in-combination with other projects or plans) are reasonably foreseeable on the integrity of the Habitats Sites, if the suggested mitigation measures are observed. Given no residual significant effects have been identified, consequently an in-combination assessment with other projects or plans is not required. This assessment must be revised if further design iterations result in changes to potential impact pathways and potential significant effects upon Habitats Sites. This would be undertaken as part of a formal HRA to be completed at the appropriate stage of design, pursuant to the consenting regime.

7 Summary and next steps

7.1 Conclusions

This section sets out the conclusions based on the SRO SEA findings and additional assessment that has been undertaken to date for Option B and Option C.

The SEA identified that both options (Route B and C) have similar effects for each of the SEA objectives with both options scoring the same against each objective given they follow very similar routes.

Major positive effects (pre mitigation and post mitigation) have been identified for both options (Route B and C) for the SEA objective on delivering reliable and resilient water supplies given the options improve the transfer of water across regions. Minor positive effects (pre mitigation and post mitigation) have been identified for both options (Route B and C) in relation to climate resilience given the options contribute to efficient use of water resources, providing protection against future drought scenarios (and potentially avoids abstractions in more vulnerable areas). WFD Level 1 Assessments were undertaken for both options (Route B and Route C) and triggered the requirement for WFD Level 2 Assessments. The WFD Level 2 Assessments for both options (Route B and Route C) identified that there are potential effects associated with the construction and operational phases, however these effects can be mitigated and further WFD assessment is therefore not required. Minor negative effects (pre mitigation and post mitigation) were identified for the objective on the water environment for both options (Route B and C).

Carbon will be generated as a result of construction as well as during operation of both Route B and C. For both options (Route B and C), the SEA identified minor negative effects (pre mitigation and post mitigation) associated with carbon emissions during the construction phase and major negative effects (pre mitigation and post mitigation) during the operational phase.

Major negative effects were identified for biodiversity, flora and fauna (pre-mitigation) for both options (Route B and Route C) as a result of the options intersecting international (Natura 2000 sites) and nationally designated sites. Route B is identified to have potential effects on Bere Mill Meadows SSSI whereas Route C does not. Both of the options (Route B and Route C) have the potential to result in impacts on priority habitats and Ancient Woodland. Ancient woodland is classed as ‘irreplaceable habitat’ and both options (Route B and C) intersect an area of Ancient Woodland. However, Route C is within close proximity (within 15m) to a greater number of Ancient Woodlands compared to Route B. A HRA Stage 1 Screening and Stage 2 Appropriate Assessment has been undertaken (Annex B2) which identified that with appropriate mitigation, no likely significant effects are identified for Natura 2000 and National Site Network sites for both options (Route B and C alone and in-combination with other projects or plans). The route corridors bisect a Local Wildlife Site and several SSSIs (some of which are GWDTE). Therefore, having potential for direct impact from habitat loss and disturbance. Assuming the routes can be re-routed to avoid these sites and the ancient woodland then residual effects are likely to be reduced, however moderate effects are identified post-mitigation given the uncertainty in baseline data and potential mitigation measures required.

The options (Route B and C) both pass through the North Wessex Downs AONB and the above ground assets are also located within the AONB, as such moderate negative effects for landscape were identified for the construction and operational phases (pre-mitigation). With careful design and screening residual effects (post-mitigation) are likely to be minor. Moderate negative effects were also identified for the construction phase for the SEA objective on soil (pre-mitigation) given both options (Route B and C) have the potential for disturbance on agricultural land (Grade 2 – 5) and there is potential for the options to disturb contaminants

given they intersect or are within close proximity to historic and authorised landfill sites. Cliffeville landfill site is within the option corridor for Route B, however it is not within Route C. Given that land will be reinstated, soil management procedures are recommended and best practice to reduce contamination risk is recommended, the residual effects (post-mitigation) are likely to be minor. The construction phase of both options (Route B and C) also have the potential to cause disruption to built assets and infrastructure therefore moderate negative effects were identified pre-mitigation. Use of pipejack or micro tunnel crossings under major roads and motorways and implementation of a CTMP will help reduce effects and therefore minor negative effects are identified for both options (Route B and Route C) post mitigation. Minor negative or neutral effects were identified for the remaining SEA objectives.

Mitigation measures to prevent, reduce or off-set adverse environmental effects have been identified as part of the SEA.

7.2 Recommendations

It is recommended that the following actions are undertaken in order to take the SRO beyond Gate 2:

- The mitigation measures identified in this report inform the development of the SRO.
- The environmental assessment information from the SEA is fed into the Regional Plan and the Water Resource Management Plans. Solutions are more appropriately assessed for SEA purposes as part of SEA for WRMP and Regional Plans.
- Discuss with regulators / SEA statutory consultees any future need for SEA, with the assumption being that Environmental Impact Assessment is the most appropriate mechanism for more detailed environmental assessments at subsequent Rapid Gate milestones.
- Review the cumulative effects assessment as required given all the developments which could result in cumulative effects with T2ST are currently unknown.

A. SRO SEA output tables

Assessment Cover Information	
Option Name	Option B - Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester)
Option Description	The T2ST route begins at a new Water Treatment Works (WTW) to be located at the SESRO/STT site and ends at Yew Hill Water Supply Reservoir (WSR). It is approximately 87km in length. The majority of the pipeline installed will be 1200mm diameter which will be installed primarily using open cut excavation. An easement strip of 45m will be required, although this will typically be reduced to 25-30m to reduce impact on surrounding land. Within the easement, top soil strip would be required and a 1.8m x 2.2m deep trench would be excavated which would allow for 1m cover to the pipe and 300mm pipe bedding under the pipe. Smaller diameter connection pipelines are required in two locations, to an existing tank at Beacon Hill, and to the existing Micheldever WSR. Pipejack crossings will be required in order to cross existing railways, motorways and A roads. Minor road crossings will be installed using open cut methods and temporary road closure. Pipejack crossings will be required in order to cross large watercourses. Crossings for smaller watercourses will be installed using open cut methods and temporary culverts. There are two options within the T2ST SRO for transferring water from a WTW at the intake Location to the existing Yew Hill WSR near Otterbourne. This assessment refers to the following: Option B - Central route via Newbury (West of Newbury and remaining west of the A34, to Winchester)

SEA Topic	SEA Objective	Construction Effects +	Construction Effects -	Operational Effects +	Operational Effects -	Comment	Mitigation	Residual Construction Effects +	Residual Construction Effects -	Residual Operational Effects +	Residual Operational Effects -
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	-	The option corridor bisects the following rivers and designations: Benham Park and Speen Moor LWS; River Lambourn SAC & SSSI (100.00% unfavourable - recovering); Kennet Valley Alderwoods SAC & SSSI and GWDTE (100.00% favourable); River Kennet SSSI (100.00% unfavourable - recovering); River Test SSSI and GWDTE (17.91% favourable, 37.53% unfavourable - recovering, 43.52% unfavourable - no change, 1.03% unfavourable - declining); East Anton Common SSSI and GWDTE (10.13% favourable, 89.87% unfavourable - declining). As such, there is potential for direct effects on these sites during the construction phase. Kennet and Lambourn Floodplain SAC, SSSI (68.39% favourable, 14.50% unfavourable - recovering, 1.10% unfavourable - no change, 16.01% unfavourable - declining) and GWDTE; Avery's Pightle SSSI (100.00% unfavourable - recovering) and GWDTE ; Burghclere Beacon SSSI (84.47% favourable, 15.53% unfavourable - no change) and GWDTE are within 500m of the option corridor. There is potential for disturbance effects on these sites during the construction phase. Ashridge Wood SSSI (100% unfavourable - recovering); Swelmore Common SSSI (34.41% favourable, 65.59% unfavourable - recovering) and GWDTE; Entborne Copse SSSI (100.00% unfavourable - recovering); Redhill Wood SSSI (100.00% unfavourable - recovering); Highclere Park SSSI (41.05% favourable, 58.95% unfavourable - recovering) and GWDTE; Old Burghclere Lime Quarry SSSI (100.00% favourable); Bransbury Common SSSI (17.68% favourable, 82.84% unfavourable - recovering); Crab Wood SSSI (100.00% favourable) and LNR; Shawford Down LNR are within 2km of the option corridor. Effects on these sites are considered unlikely. A HRA Stage 1 Screening was undertaken and an Appropriate Assessment was subsequently carried out as potential for likely significant or uncertain effects were identified for Nature 2000 sites and the UK's National Site Network and Ramsar sites. Following the Appropriate Assessment, Option B was identified as having 'no likely significant effects' (alone or in combination), after mitigation is implemented. The pipeline crosses chalk rivers, however no abstraction from a chalk stream is required and pipejack or micro tunnel crossings will be used, therefore no direct effects are anticipated. The option corridor bisects one area of ancient and semi-natural woodland, and several areas of priority habitat including deciduous woodland, lowland calcareous grassland, and floodplain grazing marsh. These habitats are likely to be negatively impacted during construction works by direct damage to chalk grassland flora during open cut excavation pipe installation, and indirectly via trampling from use of heavy machinery. Calcareous grasslands are low-nutrient sites that are likely to also be indirectly impacted from NOx from heavy plant. The option corridor and above ground infrastructure has the potential to impact protected and priority species along its length during construction. Direct impacts are likely to result from habitat loss, such as from loss of shelter, foraging and commuting opportunities, severance of routes through the landscape, further fragmentation of habitat etc. There are also likely to be indirect effects associated with construction, due to disturbance from construction plant and machinery, the presence of people, lighting, creation of dust etc. During operation, impacts upon habitats and protected species are likely to be low. The water to be transferred is proposed to be of potable standard, and therefore any potential leaks are unlikely to lead to transfer of INNS to sensitive habitats within, or hydrologically connected to, the pipeline route. The above ground assets will be newly-constructed facilities, and therefore are unlikely to result in significant leaks that would alter the groundwater levels to such an extent that habitats are impacted. Planned maintenance or replacement of pipeline sections have the potential to impact habitats and protected species, however impacts are likely to be highly localised and likely to be sufficiently mitigated by Ecological Method Statements and ecological supervision.	Avoid impacts on designated sites where possible through re-routing the pipeline to avoid priority habitats, ancient woodland and SSSIs. If this cannot be accommodated, pipejack or micro tunnel crossings should be employed to allow the pipeline to cross under these protected areas. Best practice methods to be implemented to minimise disturbance effects and habitat loss. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys to inform future design. HRA AA identified that appropriate mitigation is required to ensure that there are no significant effects on the integrity of the relevant Nature 2000 sites and the UK's National Site Network and Ramsar sites. This should therefore be implemented. Investigate opportunities for nature based solutions and BNG such as creation of high value habitat, habitat creation or improvement works within habitat network zones to support nature recovery network and create wildlife corridors.	0	---	0	0
Soil	Protect and enhance the functionality, quantity and quality of soils	0	---	0	0	The pipeline route passes through agricultural land classed as Grade 2, 3, 4 and 5. It also passes through land classed as urban and non-agricultural. There is potential for disturbance to these soils during the construction phase, however land will be reinstated. Ground disturbance in the form of topsoil/subsoil stripping can adversely affect soil quality during the construction process through inappropriate handling during stripping, stockpiling and reinstatement. These can impact soil function which will ultimately affect crop/vegetation growth. For temporary works it is anticipated that the majority of stripped topsoil/subsoil resource will be reinstated. A volume of subsoil may be permanently lost from the volume of strip that is associated with space occupied by underground pipelines. These soils will be appropriately stockpiled and managed prior to reinstatement upon the completion of pipe installation for a particular section. There is permanent land take required for the option given new assets are required as part of the option. The current locations of these are within agricultural land classed as Grade 3. For permanent land-take, topsoil/subsoil strip is anticipated to precede construction works and will present a permanent loss of topsoil/subsoil resource (where present) from the stripped area. The pipeline route passes through historic and authorised landfill sites, including Cliffe Ville Landfill which is within the option corridor, and there are also additional landfill sites within proximity to the route. There is potential that the construction phase could disturb contaminants.	Ground will be reinstated therefore residual effects unlikely, however permanent loss will remain. Re-route the pipeline to avoid landfill sites if possible. Best practice techniques to prevent potential disturbance of contaminated material during construction The stripping, stockpiling, maintenance, reinstatement and aftercare of soil resources should be undertaken in accordance with Defra and British Standards soil guidance. During construction activities, it is recommended that a qualified soil scientist undertake on-site monitoring visits to ensure the best practice and guidance as stated in the soil management plan is followed. Detailed soil survey which can be used to inform a soil management plan. Undertake further assessment of the landfill with a possible requirement for a Phase 1 contaminated land desk study and implement appropriate mitigation measures as identified.	0	-	0	0
Water	Increase resilience and reduce flood risk	0	--	0	--	The pipeline route is predominately within Flood Zone 1, however it does pass through areas of Flood Zone 2 and 3. There may be some risk of flooding during the construction phase as a result. There is unlikely to be effects for the pipeline during the operational phases given it is buried. The new WTW at the intake location is recorded in both Flood Zone 3 and 2 the extent of which is focused on the northern border of the location. Potential for construction and operation effects from flood events.	Measures to reduce the impact on flooding during the construction phase. It is recommended that new WTW at the intake location remains under review as the design evolves and construction activity takes place outside of Flood Zones 3a and 3b.	0	-	0	-
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	The option crosses several waterbodies, including main rivers and chalk rivers, and during the construction phase there is potential for the water environment to be impacted such as through contaminated run-off. The pipeline passes through five SPZ1 and five SPZ2 and also through WFD groundwater bodies. There is potential for impact on the groundwater as a result of construction of the option pipelines interfering with the natural groundwater flow and quality. This could result in disruption of supply from these sources. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2, then additional mitigation will be required. At Gate 2 WFD Level 1 and subsequent Level 2 Assessments were undertaken for the option. The WFD Level 2 assessment identified the potential for construction and operational related risks for River Test Chalk (GB)(GB407010150)200), however it is identified that these effects can be mitigated and further WFD assessment is therefore not required.	Pollution Prevention and control measures to reduce likelihood of contaminants leaching through soil and entering water environment (such as interception ditches and/or silt mats). Pipejack or micro tunnel crossings used where possible. Undertake hydrogeological risk assessment for works within SPZ1 or 2, then implement additional mitigation as required. Residual risk remains given hydrological assessment is still to be carried out. Implement mitigation measures as outlined in the WFD Level 2 assessment.	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	The scheme will improve water transfer across regions, improving water resource management and resilience of supply.	N/A	0	0	+++	0
Air	Reduce and minimise air emissions	0	-	0	0	The pipeline does not pass through or near any AQMAs or Clean Air Zones. The construction phase will likely result in minor effects on local air quality. The EAR indicates that there are sensitive human health, dust soiling and ecological receptors within 350m of the option which could be impacted as a result of construction activities.	Best practice mitigation measures likely to be implemented during construction including measures to mitigate dust nuisance in accordance with the Institute of Air Quality Management (IAQM) guidance (such as a dust risk assessment). The air quality impacts associated with vehicle traffic during the construction and operation phases and the impacts from the standby generators should also be assessed once further details of these activities are available	0	-	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	0	---	Carbon will generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation (e.g. pumping stations). The relative carbon scale identified that the options has minor construction and major operation carbon emissions (relative to other WRSE Regional Plan options)	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.	0	-	0	---
	Reduce vulnerability to climate change risks and hazards	0	0	+	0	This scheme contributes to efficient use of water resources, providing protection against future drought scenarios (and potentially avoids abstractions in more vulnerable areas).	N/A	0	0	+	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	---	0	---	The pipeline route passes through the North Wessex Downs AONB. It passes through Upper Thames Clay Vales, Berkshire and Marlborough Downs, Thames Basin Heaths and Hampshire Downs NCAs. The South Downs National Park is within 2km. There is likely to be disturbance to the local landscape during the construction phase, however land will be reinstated at the pipeline route. There will be above-ground infrastructure which will lead to a permanent change in the landscape. There are three assets which are located within the AONB. As such, there may be permanent changes to the landscape as a result of the scheme.	Best practice measures to be implemented to minimise effects during construction although temporary effects during construction may remain. Land reinstated upon completion, however there is likely to be a permanent change in the landscape as a result of the scheme given the new above ground infrastructure and land-take required. Implement visual screening to minimise operational effects.	0	-	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	The construction phase of the Scheme has the potential to effect four Conservation Areas: West Hendred Conservation Area; East Hendred Conservation Area; East End and North End Conservation Area; St Mary Bourne and Stoke Conservation Area. There may be effects during the construction phase on the Scheduled Monument of 'Barrow N of ridgeway, Hodcott Down' and Grim's Ditch. The setting of the following heritage items has the potential to face temporary impacts during construction: Ducklebridge Grade II Listed Building; Gangbridge House Grade II Listed Building; Grade II* Listed Park and Garden, Lamston House. There is also the potential for effects on a potential Roman villa identified at Ebcote through aerial imagery; possible below-ground remains of a Roman building as indicated by cropmarks and debris associated with a Romano-British building; prehistoric or possible medieval earthworks and enclosures at Sutton Scotney, Wonston, South Wonston, Worthy Grove, Lower Farm Cottages, Littleton, Lanham Down, and Down Farm; and probable remains of a Second World War heavy anti-aircraft battery at Vale Farm. However, this is largely dependent on the presence of any the below-ground remains of the structures. There are potential earthworks and field systems identified on aerial imagery at the north of Section 1 which have the potential to contain below-ground remains which may lead to a permanent impact on these assets during construction. While areas of below-ground archaeological remains are difficult to predict, because much of the Scheme is located within agricultural fields that have seen little disturbance there is a higher potential for below-ground archaeology that may be impacted during construction of the Scheme. Operation of the Scheme is unlikely to have any permanent impact on the identified assets.	Best practice methods during the construction phase to minimise the effect on the setting of historic assets. For works within Conservation Areas it is recommended that mitigation measures should be considered such as minimising disruption during works, measures to avoid impacts upon key views, noise screening, and monitoring noise and vibration. Archaeological monitoring required as a minimum, non-intrusive geophysical survey followed by trial trenching may be required.	0	-	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	-	There are various community facilities within 500m of the pipeline route. There is potential for disturbance to the local community and users of these community facilities during the construction phase. There is the potential for temporary impacts, as a result of land requirements, on housing or private property. The majority of land along the route is agricultural which may have an impact (both permanent and temporary) on the operation of businesses that carry out this function. The pipeline bisects a number of roads, so there may be temporary disruption for communities which use these routes to travel between communities and to access facilities. HAD decides range from 5 to 10 along the pipeline route. During operation, potential impacts are likely to be minimal given the pipeline will be below ground and the land which was utilised during construction reinstated. However, the operation of the above ground assets is likely to change the amenity for nearby populations and human health receptors due to potential noise, air quality and visual impacts. The communities most likely to be impacted are in Drayton due to the operation of the new WTW at the intake location. Given the distance between all other above ground assets and communities, no other impacts are anticipated.	Setting out how engagement with local communities will be undertaken during construction. Implementation of specific measures in relation to air quality and noise to reduce impacts on neighbouring residents communities, particularly for sensitive community resources such as educational facilities, health facilities and care homes. Developing mitigation for local road closures and diversions when details are known regarding timing and duration of closure. Developing mitigation for temporary trainline closures and disruption to trainline services when details are known regarding timing and duration of closure, in order to reduce direct impacts from travel disruption. The above ground assets should have landscaping, air quality and noise mitigation included in their design, in order to limit the potential indirect impacts from noise and air pollution on properties and businesses and open spaces. Sensitive layout and siting of potential construction compounds that take into consideration the potential impacts from noise, traffic, air quality and visual effects on communities. Maintenance or diversion of key routes used by the community such as footpaths and pedestrian and cycling routes.	0	-	0	-
	Maintain and enhance tourism and recreation	0	-	0	0	There are various recreational facilities within 500m of the pipeline route. The pipeline intersects a National Trail and National Cycle Routes. Public rights of way are also intersected by the pipeline route.	Best practice construction methods to reduce amenity effects for the community.	0	-	0	0
Material Assets	Minimise resource use and waste production	0	-	0	0	The pipeline construction will require materials and resource use. Excavated material is likely to be reused onsite.	Opportunity to implement sustainable design measures to reduce the impact, however it is likely that minor negative effects will remain. Source materials locally where possible.	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	---	0	0	The pipeline intersects railway lines, major roads, National Trail and National Cycle Routes. There is potential for disruption to these during the construction phase.	Use of pipejack or micro tunnel crossings where possible to minimise disruption. Implement a Construction Traffic Management Plan to minimise traffic related disruption during the construction phase.	0	-	0	0
	SEA Metrics	Positive 9 Negative -69						Positive 9 Negative -26			

Assessment Cover Information	
Option Name	Option C - Central route via Newbury (West of Newbury and then crossing east over the A34, to Winchester)
Option Description	The T2ST route begins at a new Water Treatment Works (WTW) to be located at the SESRO/STT site and ends at Yew Hill Water Supply Reservoir (WSR). It is approximately 87km in length. The majority of the pipeline installed will be 1200mm diameter which will be installed primarily using open cut excavation. An easement strip of 45m will be required, although this will typically be reduced to 25-30m to reduce impact on surrounding land. Within the easement, top soil strip would be required and a 1.8m x 2.2m deep trench would be excavated which would allow for 1m cover to the pipe and 300mm pipe bedding under the pipe. Smaller diameter connection pipelines are required in two locations, to an existing tank at Beacon Hill, and to the existing Micheldever WSR. Pipejack crossings will be required in order to cross existing railways, motorways and A roads. Minor road crossings will be installed using open cut methods and temporary road closure. Pipejack crossings will be required in order to cross large watercourses. Crossings for smaller watercourses will be installed using open cut methods and temporary culverts. There are two options within the T2ST SRO for transferring water from a new WTW at the intake location to the existing Yew Hill WSR near Otterbourne. This assessment refers to the following: Option C - Central route via Newbury (West of Newbury and then crossing over the A34, to Winchester)

SEA Topic	SEA Objective	Construction Effects		Operational Effects		Comment	Mitigation	Residual Construction Effects		Residual Operational Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	0	-	The option corridor bisects the following rivers and designations: Bentem Park and Speen Moor LWS; River Lambourn SAC & SSSI (100.00% unfavourable - recovering); Kennet Valley Alderwoods SAC & SSSI and GWDTE (100.00% favourable); River Kennet SSSI (100.00% unfavourable - recovering); River Test SSSI and GWDTE (17.91% favourable, 37.53% unfavourable - recovering, 43.52% unfavourable - no change, 1.03% unfavourable - declining); East Aston Common SSSI and GWDTE (10.13% favourable, 89.87% unfavourable - declining); Burghclere Beacon SSSI (84.47% favourable, 15.53% unfavourable - no change) and GWDTE; Bere Mill Meadows SSSI (100.00% unfavourable - recovering) and GWDTE. As such, there is potential for direct effects on these sites during the construction phase. Kennet and Lambourn Floodplain SAC, SSSI (68.39% favorable, 14.50% unfavourable - recovering, 1.10% unfavourable - no change, 16.01% unfavourable - declining) and GWDTE; Avery's Pightle SSSI (100.00% unfavourable - recovering) and GWDTE are within 500m of the option corridor. There is potential for disturbance effects on these sites during the construction phase. Kennet Valley Alderwoods SAC, SSSI (100.00% favourable) and GWDTE; Old Burghclere Lime Quarry SSSI (100.00% favourable) are also within 500m. Ashridge Wood SSSI (100% unfavourable - recovering); Snelmore Common SSSI (34.41% favourable, 65.59% unfavourable - recovering) and GWDTE; Enborne Copse SSSI (100.00% unfavourable - recovering); Redhill Wood SSSI (100.00% unfavourable - recovering); Herbert Plantation LNR; Highclere Park SSSI (41.05% favourable, 58.95% unfavourable - recovering) and GWDTE; Ladle Hill SSSI (100.00% favourable); Crab Wood SSSI (100.00% favourable) and LNR; and Shawford Down LNR are within 2km of the pipeline route. Effects on these sites are considered unlikely. A HRA Stage 1 Screening was undertaken and an Appropriate Assessment was subsequently carried out as potential for likely significant or uncertain effects were identified for Natura 2000 sites and the UK's National Site Network and Ramsar sites. Following the Appropriate Assessment, Option C was identified as having 'no likely significant effects' (alone or in combination), after mitigation is implemented. The pipeline crosses chalk rivers, however no abstraction from a chalk stream is required and pipejack or micro tunnel crossings will be used, therefore no direct effects are anticipated. The option corridor bisects one area of ancient and semi-natural woodland and several areas of priority habitat including deciduous woodland, lowland calcareous grassland, and floodplain grazing marsh. These habitats are likely to be negatively impacted during construction works by direct damage to chalk grassland flora during open cut excavation pipe installation, and indirectly via trampling from use of heavy machinery. Calcareous grasslands are low-nutrient sites that are likely to also be indirectly impacted from NOx from heavy plant. The option corridor and above ground infrastructure has the potential to impact protected and priority species along its length during construction. Direct impacts are likely to result from habitat loss, such as from loss of shelter, foraging and commuting opportunities, severance of routes through the landscape, further fragmentation of habitat etc. There are also likely to be indirect effects associated with construction, due to disturbance from construction plant and machinery, the presence of people, lighting, creation of dust etc. During operation, impacts upon habitats and protected species are likely to be low. The water to be transferred is proposed to be of potable standard, and therefore any potential leaks are unlikely to lead to transfer of INNS to sensitive habitats within, or hydrologically connected to, the pipeline route. The above ground assets will be newly-constructed facilities, and therefore are unlikely to result in significant leaks that would alter the groundwater levels to such an extent that habitats are impacted. Planned maintenance or replacement of pipeline sections have the potential to impact habitats and protected species, however impacts are likely to be highly localised and likely to be sufficiently mitigated by Ecological Method Statements and ecological supervision.	Avoid impacts on designated sites where possible through re-routing the pipeline to avoid priority habitats, ancient woodland and SSSIs. If this cannot be accommodated, pipejack or micro tunnel crossings should be employed to allow the pipeline to cross under these protected areas. Best practice methods to be implemented to minimise disturbance effects and habitat loss. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Undertake ecology surveys to inform future design. HRA AA identified that appropriate mitigation is required to ensure that there are no significant effects on the integrity of the relevant Natura 2000 sites and the UK's National Site Network and Ramsar sites. This should therefore be implemented. Investigate opportunities for nature based solutions and BNG such as creation of high value habitat, habitat creation or improvement works within habitat network zones to support nature recovery network and create wildlife corridors.	0	---	0	0
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	0	0	The pipeline route passes through agricultural land classed as Grade 2, 3, 4 and 5. It also passes through land classed as urban and non-agricultural. There is potential for disturbance to these soils during the construction phase, however land will be reinstated. Ground disturbance in the form of topsoil/subsoil stripping can adversely affect soil quality during the construction process through inappropriate handling during stripping, stockpiling and reinstatement. These can impact soil function which will ultimately affect crop/vegetation growth. For temporary works it is anticipated that the majority of stripped topsoil/subsoil resource will be reinstated. A volume of subsoil may be permanently lost from the volume of strip that is associated with space occupied by underground pipelines. These soils will be appropriately stockpiled and managed prior to reinstatement upon the completion of pipe installation for a particular section. There is permanent land take required for the option given new assets are required as part of the option. The current locations of these are within agricultural land classed as Grade 3. For permanent land-take, topsoil/subsoil strip is anticipated to precede construction works and will present a permanent loss of topsoil/subsoil resource (where present) from the stripped area. The pipeline route passes through historic landfill sites and there are also additional landfill sites within proximity to the route. There is potential that the construction phase could disturb contaminants.	Ground will be reinstated therefore residual effects unlikely, however permanent loss will remain. Re-route pipeline to avoid landfill sites if possible. Best practice techniques to prevent potential disturbance of contaminated material during construction: The stripping, stockpiling, maintenance, reinstatement and aftercare of soil resources should be undertaken in accordance with Defra and British Standards soil guidance. During construction activities, it is recommended that a qualified soil scientist undertake on-site monitoring visits to ensure the best practice and guidance as stated in the soil management plan is followed. Detailed soil survey which can be used to inform a soil management plan. Undertake further assessment of the landfill with a possible requirement for a Phase 1 contaminated land desk study and implement appropriate mitigation measures as identified.	0	-	0	0
Water	Increase resilience and reduce flood risk	0	--	0	--	The pipeline route is predominately within Flood Zone 1, however it does pass through areas of Flood Zone 2 and 3. There may be some risk of flooding during the construction phase as a result. There is unlikely to be effects for the pipeline during the operational phase given it is buried. The new WTW at the intake location is recorded in both Flood Zone 3 and 2 the extent of which is focused on the northern border of the location. Potential for construction and operation effects from flood events.	Measures to reduce the impact on flooding during the construction phase. It is recommended that new WTW at the intake location remains under review as the design evolves and construction activity takes place outside of Flood Zones 3a and 3b.	0	-	0	-
	Protect and enhance the quality of the water environment and water resources	0	-	0	0	The option crosses several waterbodies, including main rivers and chalk rivers, and during the construction phase there is potential for the water environment to be impacted such as through contaminated run off. The pipeline passes through five SPZ1 and six SPZ2 and also passes through WFD Groundwater bodies. There is potential for impact on the groundwater as a result of construction of the option pipelines interfering with the natural groundwater flow and quality. This could result in disruption of supply from these sources. Prior to construction a hydrogeological risk assessment will be required for works within SPZ1 or 2, then additional mitigation will be required. The Gate 2 WFD Level 1 and subsequent Level 2 Assessments were undertaken for the option. The WFD Level 2 assessment identified the potential for construction and operational related risks for River Test Chalk (GW)GB40701GS01200), however it is identified that these effects can be mitigated and further WFD assessment is therefore not required.	Pollution Prevention and control measures to reduce likelihood of contaminants leaching through soil and entering water environment (such as interception ditches and/or silt mats). Pipejack or micro tunnel crossings used where possible. Undertake hydrogeological risk assessment for works within SPZ1 or 2, then implement additional mitigation as required. Residual risk remains given hydrological assessment is still to be carried out. Implement mitigation measures as outlined in the WFD Level 2 assessment.	0	-	0	0
	Deliver reliable and resilient water supplies	0	0	+++	0	The scheme will improve water transfer across regions, improving water resource management and resilience of supply.	N/A	0	0	+++	0
Air	Reduce and minimise air emissions	0	-	0	0	The pipeline does not pass through or near any AQMAs or Clean Air Zones. The construction phase will likely result in minor effects on local air quality. The EAR indicates that there are sensitive human health, dust soiling and ecological receptors within 350m of the option which could be impacted as a result of construction activities.	Best practice mitigation measures are likely to be implemented during construction including measures to mitigate dust nuisance in accordance with the Institute of Air Quality Management (IAQM) guidance (such as a dust risk assessment). The air quality impacts associated with vehicle traffic during the construction and operation phases and the impacts from the standby generators should also be assessed once further details of [illegible]	0	-	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	-	0	---	Carbon will generated from materials used to construct the pipeline (embodied carbon), construction activities and from operation (e.g. pumping stations). The relative carbon scale identified that the options has minor construction and major operation carbon emissions (relative to other WRSE Regional Plan options)	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.	0	-	0	---
	Reduce vulnerability to climate change risks and hazards	0	0	+	0	This scheme contributes to efficient use of water resources, providing protection against future drought scenarios (and potentially avoids abstractions in more vulnerable areas).	N/A	0	0	+	0
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	--	0	--	The pipeline route passes through the North Wessex Downs AONB. It passes through Upper Thames Clay Vales, Berkshire and Marlborough Downs, Thames Basin Heaths and Hampshire Downs NCAs. The South Downs National Park is within 2km. There is likely to be disturbance to the local landscape during the construction phase, however land will be reinstated at the pipeline route. There will be above ground infrastructure which will lead to a permanent change in the landscape. There are three assets which are all located within the AONB. As such, there may be permanent changes to the landscape as a result of the scheme.	Best practice measures to be implemented to minimise effects during construction although temporary effects during construction may remain. Land reinstated upon completion, however there is likely to be a permanent change in the landscape as a result of the scheme given the new above ground infrastructure and land take required. Implement visual screening to minimise operational effects.	0	-	0	-
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	-	0	0	The construction phase of the Scheme has the potential to cause temporary effects to the following Conservation Areas: West Hendred Conservation Area; East Hendred Conservation Area; Lavenstoke and Freefolk Conservation Area. There may be effects during the construction phase on the Scheduled Monument of 'Barrow N of ridgeway, Hodcott Down' and Grim's Ditch. The setting of the following heritage items has the potential to face temporary effects during construction: Duckbridge Grade II Listed Building; Geographe House Grade II Listed Building; Grade II* Listed Park and Garden, Lainston House. There is also the potential to have a effects on a potential Roman villa identified at Enborne through aerial imagery; the remains of a possible ring ditch, prehistoric trackway and field system to the north-west of Tufton Warren; prehistoric or possible medieval earthworks and enclosures at Sutton Scotney, Wonston, South Wonston, Worthy Grove, Lower Farm Cottages, Littleton, Lanham Down, and Down Farm; and probable remains of a Second World War heavy anti-aircraft battery at Vale Farm. However, this is largely dependent on the presence of any the below-ground remains of the structures. There are potential earthworks and field systems identified on aerial imagery at the north of Section 1 which have the potential to contain below-ground remains which may lead to a permanent impact on these assets during construction. Three non-designated heritage assets have the potential to be impacted by the construction of the Scheme. The first asset is a deserted settlement (1066 AD-1539 AD) at Old Burghclere which is evidenced through historic records and cropmarks. Any construction works in this area has the potential to impact any possible below-ground remains relating to this site. While areas of below-ground archaeological remains are difficult to predict, because much of the Scheme is located within agricultural fields that have seen little disturbance there is a higher potential for below-ground archaeology that may be impacted during construction of the Scheme. Operation of the Scheme is unlikely to have any permanent impact on the identified assets.	Best practice methods during the construction phase to minimise the effect on the setting of historic assets. For works within Conservation Areas it is recommended that mitigation measures should be considered such as minimising disruption during works, measures to avoid impacts upon key views, noise screening, and monitoring noise and vibration. Archaeological monitoring required as a minimum, non-intrusive geophysical survey followed by trial trenching may be required.	0	-	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	-	0	-	There are various community facilities within 500m of the pipeline route. There is potential for disturbance to the local community and users of these community facilities during the construction phase. There is the potential for temporary impacts, as a result of land requirements, on housing or private property. The majority of land along the route is agricultural which may have an impact (both permanent and temporary) on the operation of businesses that carry out this function. The pipeline bisects a number of roads, so there may be temporary disruption for communities which use these routes to travel between communities and to access facilities. IMD deciles range from 5 to 10 along the pipeline route. During operation, potential impacts are likely to be minimal given the pipeline will be below ground and the land which was utilised during construction reinstated. However, the operation of the above ground assets is likely to change the amenity for nearby population and human health receptors due to potential noise, air quality and visual impacts. The communities most likely to be impacted are in Drayton due to the operation of the new WTW at the intake location. Given the distance between all other above ground assets and communities, no other impacts are anticipated.	[illegible] construction. Implementation of specific measures in relation to air quality and noise to reduce impacts on neighbouring residents communities, particularly for sensitive community resources such as educational facilities, health facilities and care homes. Developing mitigation for local road closures and diversions when details are known regarding timing and duration of closure. Developing mitigation for temporary trainline closures and disruption to trainline services when details are known regarding timing and duration of closure, in order to reduce direct impacts from travel disruption. The above ground assets should have landscaping, air quality and noise mitigation included in their design, in order to limit the potential indirect impacts from noise and air pollution on properties and businesses and open spaces. Sensitive layout and siting of potential construction compounds that take into consideration the potential impacts from noise, traffic, air quality and visual effects on communities. Maintenance or diversion of key routes used by the community such as footpaths and pedestrian and cycling routes.	0	-	0	-
	Maintain and enhance tourism and recreation	0	-	0	0	There are various recreational facilities within 500m of the pipeline route. The pipeline intersects a National Trail and National Cycle Routes. Public rights of way are also intersected by the pipeline route.	Best practice construction methods to reduce amenity effects for the community.	0	-	0	0
Material Assets	Minimise resource use and waste production	0	-	0	0	The pipeline construction will require materials and resource use. Excavated material is likely to be reused onsite.	Opportunity to implement sustainable design measures to reduce the impact, however it is likely that minor negative effects will remain. Source materials locally where possible.	0	-	0	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	The pipeline intersects railway lines, major roads, National Trail and National Cycle Routes. There is potential for disruption to these during the construction phase.	Use of pipejack or micro tunnel crossings where possible to minimise disruption. Implement a Construction Traffic Management Plan to minimise traffic related disruption during the construction phase.	0	-	0	0
	SEA Metrics	**Positive**	**9**					**Positive**	**9**		
		Negative	**-49**					**Negative**	**-26**		

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

SEA Objective	Datasets/Key Themes	Effect		Description
Biodiversity, Flora, Fauna: Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	SPA SAC Ramsar site SSSIs MPA MCZ NNR LNR Priority habitats and species Non-designated sites Terrestrial, aquatic and marine habitats, species and protected sites Green networks and corridors (e.g. foraging areas and commuting routes, migration routes, hibernation areas etc. at all scales)	+++	Major Positive	The option would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. The option would result in a major reduction or management of INNS.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. The option would result in a moderate reduction or management of INNS.
		+	Minor Positive	The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. The option would result in a minor reduction or management of INNS.
		0	Neutral	The option would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.
		-	Minor Negative	The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. The option would result in a minor increase or spread of INNS.
		--	Moderate Negative	The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. The options would result in a moderate increase or spread of INNS.
		---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
Soil: Protect and enhance the functionality, quantity and quality of soils	Agricultural Land Classification Landfill sites – authorised and historic	+++	Major Positive	The option would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
		+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
		0	Neutral	The option would not result in any effects on soils or land use.
		-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination.
		--	Moderate Negative	The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation.
		---	Major Negative	The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
Water: Increase resilience and reduce flood risk Protect and enhance the quality of the water environment and water resources Deliver reliable and resilient water supplies	Environment Agency Flood Defences Environment Agency Main Rivers Flood Zones 2 and 3 Surface Water Features WFD River Waterbody Catchments WFD River Waterbodies Cycle 2 Bathing Waters (for desal options) Shellfish Waters (desal options) Source Protection Zones WFD Groundwater bodies	+++	Major Positive	The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk. The option would result in a major improvements in water efficiency, reduces demand and improves resilience.
		++	Moderate Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a moderate improvement to flood risk. The option would result in a moderate improvements in water efficiency, reduces demand and improves resilience.
		+	Minor Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option would result in a minor improvement to flood risk. The option would result in a minor improvements in water efficiency, reduces demand and improves resilience.
		0	Neutral	The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk.
		-	Minor Negative	The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated. The option would result in minor decreases in groundwater quality or levels. The option is located in Flood Zone 2. The option would result in minor decreases in water efficiency, increases demand and reduces resilience.
		--	Moderate Negative	The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the likely deterioration of WFD classification. The option would result in moderate decreases in groundwater quality or levels. The option is located in Flood Zone 3. The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.
		---	Major Negative	The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the deterioration of WFD classification. The option would result in major decreases in groundwater quality or levels. The option is located in Flood Zone 2 or 3 and further contributes to flood risk. The option would result in major decreases in water efficiency, increases demand and reduces resilience.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Air: Reduce and minimise air emissions	Air Quality Management Zones Air quality monitoring sites	+++	Major Positive	The option would result in a major enhancement of the air quality within one or more AQMAs.
		++	Moderate Positive	The option would result in a moderate enhancement of the air quality within one or more AQMAs.
		+	Minor Positive	The option would result in an enhancement of the air quality.
		0	Neutral	The option would not result in any effects on Air Quality and AQMAs.
		-	Minor Negative	The option would result in a decrease of the air quality.
		--	Moderate Negative	The option would result in a decrease of the air quality within one or more AQMAs.
		---	Major Negative	The option would result in a major decrease in the air quality within one or more AQMAs.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Climate Factors: Reduce embodied and operational carbon emissions Reduce vulnerability to climate change risks and hazards ?	Option Carbon data UKCP18 climate data Sea level rise projections	+++	Major Positive	The option will generate significant additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale) The option will result in a major increase in carbon sequestration. The option will increase resilience/decrease vulnerability to climate change effects.
		++	Moderate Positive	The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a moderate increase in carbon sequestration. The option will generate moderate additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)
		+	Minor Positive	The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a minor increase in carbon sequestration. The option will generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)
		0	Neutral	The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.
		-	Minor Negative	The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate minor construction and/or operational carbon emissions (see carbon scale).
		--	Moderate Negative	The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate moderate construction and/or operational carbon emissions (see carbon scale). The option will result in a moderate release of previously sequestered carbon.
		---	Major Negative	The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate significant construction and/or operational carbon emissions (see carbon scale). The option will result in a major release of previously sequestered carbon.
		?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Landscape: Conserve, protect and enhance landscape, townscape and seascape	Areas of Outstanding Natural Beauty National Character Areas Green Belt land National Park ?	+++	Major Positive	The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
		++	Moderate Positive	The option would have a moderate positive contribution to designated landscape management plan objectives The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.
		+	Minor Positive	The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
		0	Neutral	The option would not result in any effects on the local landscape, townscape or seascape.

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