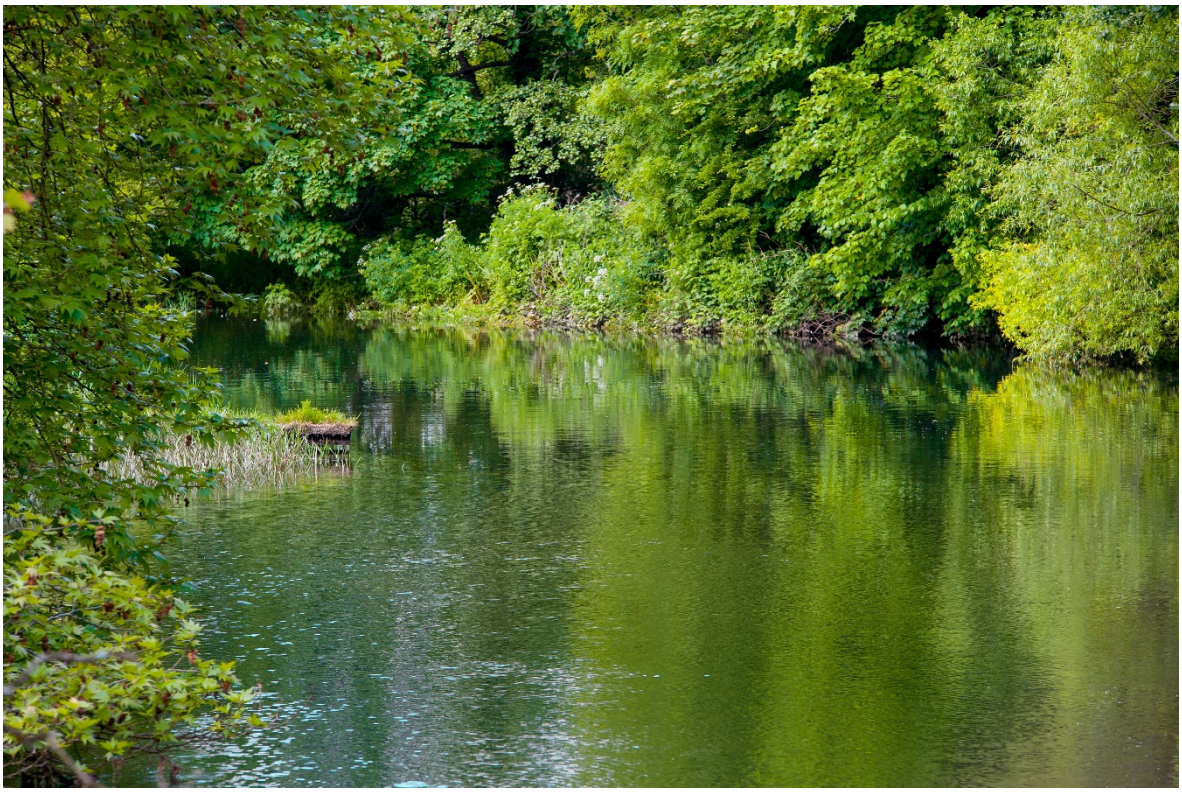
Strategic Regional Water Resource Solutions: Annex A2 Route and Site Selection Report

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

Date: November 2022



Notice

Position Statement

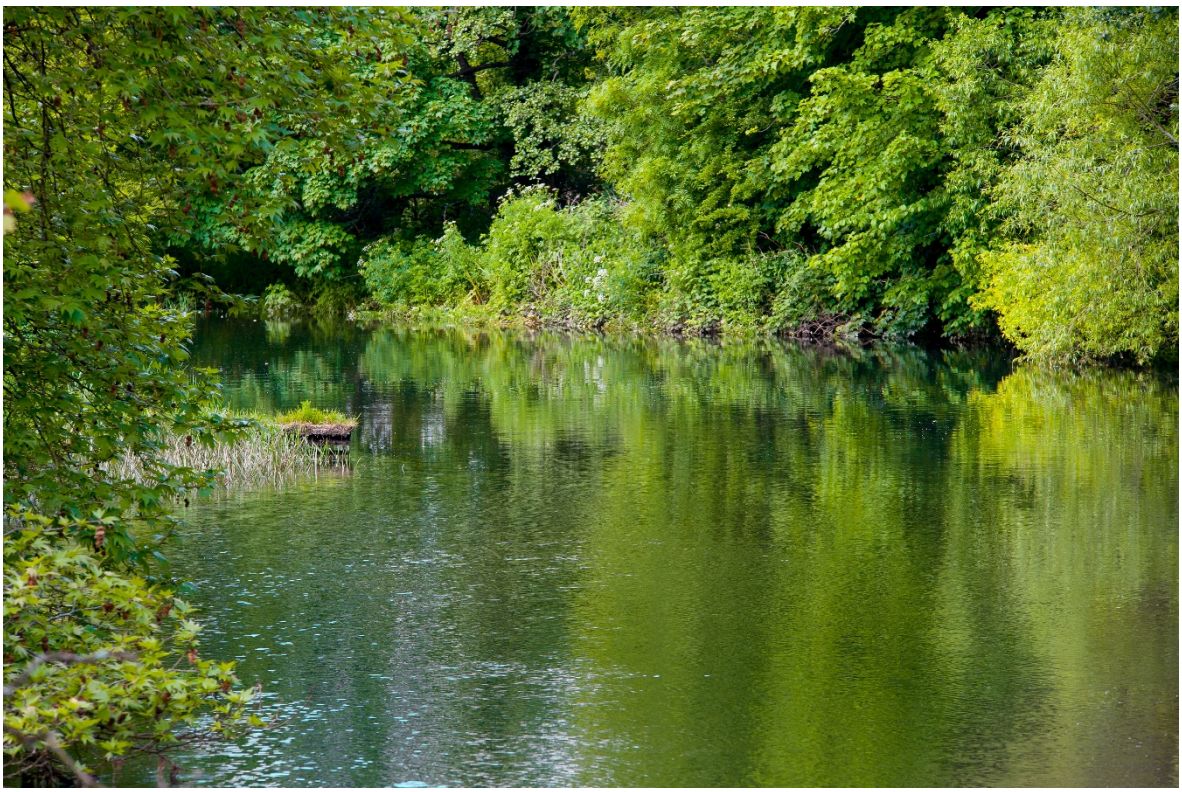
- *This document has been produced as the part of the process set out by RAPID for the development of the Strategic Resource Options (SROs). This is a regulatory gated process allowing there to be control and appropriate scrutiny on the activities that are undertaken by the water companies to investigate 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.

Thames to Southern Transfer
Route and Site Selection Report
T2ST-G2-REP-02 (Annex A2)

November 2022



THAMES TO SOUTHERN TRANSFER (T2ST)

Annex A2 Route and Site Selection Report

Ref: T2ST-G2-REP-02 (Annex A2) November 2022

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Contents

Executive Summary

0.1. This Report provides the Route and Site Selection Report for the Thames to Southern Transfer (T2ST) Strategic Resource Option for the purposes of the RAPID Gate 2 submission. The report can be summarised as follows.

Context

0.2. As part of the Gate 2 work, further investigation and assessment has been undertaken on potential transfer pipeline route corridors and sites, to enable the identification of preferred option(s) for the purposes of the Gate 2 submission.

Methodology

0.3. A multi-stage methodology was devised by the T2ST project team for the identification and assessment of corridors and sites. This was a desk based exercise utilising existing published sources of information, largely captured within a GIS system, to enable potential pipeline route corridor sections and sites to be identified and assessed in the context of engineering, environmental, planning and land criteria.

0.4. The seven stages of the assessment, and the outcomes achieved, are summarised below.

Identification and assessment of route corridor sections (Stages 1 to 2b)

0.5. At Stage 1 the GIS system was used to identify approximately 100 potential pipeline corridor sections that avoided or minimised impacts on the mapped environmental, planning and land criteria. These corridor sections were then assessed by the project team in Stage 2a against engineering, environmental, planning and land criteria, utilising a ‘red, amber, green’ (RAG) assessment system. A workshop was held to shortlist corridor sections in Stage 2b, the outcome of which was a list of potential pipeline corridors with related RAG assessments.

The identification and assessment of sites (Stages 3 to 4b)

0.6. At Stage 3 the GIS system was used to identify potential sites related to the shortlisted pipeline corridor sections that avoided or minimised impacts on the mapped environmental, planning and land criteria. These sites were then assessed by the project team in Stage 4a against engineering, environmental, planning and land criteria, utilising a ‘red, amber, green’ (RAG) assessment system. A workshop was held to shortlist sites in Stage 4b, the outcome of which was a list of potential sites with related RAG assessments.

Shortlisting and detailed assessment of options (Stages 5 and 6)

0.7. At Stage 5, utilising the shortlisted corridor options and sites, from Stages 2b and 4b, a number of individual T2ST Options were formed by the project team in an online workshop. Each of the options formed a complete T2ST scheme, comprising a pipeline from the proposed source of water in Oxfordshire or Berkshire, to the destination of water in Hampshire, together with sites for the treatment, pumping and other infrastructure required.

0.8. Five potential options were identified, four from the potential source in Oxfordshire (Options A-D), and one from the potential source in Berkshire (Option E). Each option sought to avoid or minimise impacts on identified environmental designations, including one option (Option A) seeking to avoid or minimise impacts on the North Wessex Downs AONB through routeing to the west of Swindon. The options were reviewed in an online workshop and shortlisted for further assessment, the outcome being that Options B, C and E were shortlisted and Options A and D were held back from further assessment as a result of the RAG assessments and constraints and issues relating to those options.

0.9. At Stage 6, the three shortlisted options (B, C and E) were subject of detailed assessment and further consideration of their suitability by the project team.

Preferred option identification (Stages 7 and 8)

0.10. At Stage 7, the T2ST engineering, environmental and planning teams undertook an online workshop session to collaboratively review the Stage 6 assessments of the three shortlisted options, using the RAG scoring and option suitability information from Stage 6. The relative merits of the three options were reviewed and assessed and a final shortlisting of the options undertaken.

0.11. The outcome of the workshop was the shortlisting of Options B and C (from the source in Oxfordshire), with Option E (from the source in Berkshire) being held back, as a result of the RAG assessments and constraints and issues relating to the options. This was then written up in this Route and Site Selection Report (Stage 8), with Options B and C being the Preferred Options for the purposes of the Gate 2 submission.

How this work will be taken forward

0.12. The Preferred Options – Option B and Option C – are taken forward as the basis for engineering, environmental and planning assessments for RAPID Gate 2 submission in November 2022, with those assessments being submitted as Annexes to the Gate 2 Report.

0.13. Beyond Gate 2, further assessments will be undertaken on specific locations and parts of the preferred options, particularly where there are potential environmental or engineering pinch points or challenges, together with potential locations for above ground infrastructure. Additional work on the land strategy for the options will also be undertaken, alongside further engagement with the local planning authorities and other key stakeholders. A back-checking process will be undertaken following further assessment work beyond Gate 2, to review whether there is a need for any re-assessment of decisions previously taken to hold back other options.

0.14. The timing and level of detail for the additional work will be driven by the timing of the delivery of T2ST as set out in the Water Resources in the South East (WRSE) draft regional plan and draft Water Resource Management Plans. It is intended that the route and site selection work will assist and inform consideration of alternatives in the context of future applications for consent, appropriately updated and with stakeholder engagement.

1. Introduction and context

1.1 Introduction

1.1.1 The Thames to Southern Transfer (T2ST) is one of a number of Strategic Resource Options (SRO) being investigated as part of the Regulators Alliance for the Progression of Infrastructure Development (RAPID), comprising Ofwat, the Environment Agency (EA) and the Drinking Water Inspectorate (DWI). T2ST is being jointly investigated by Thames Water and Southern Water, with submissions being made to RAPID through a gated process.

1.2 Purpose of the Report

1.1.2 This report has been prepared by Adams Hendry Consulting Ltd (AHCL) to explain the route and site selection process undertaken as part of the Gate 2 work, leading to the selection of preferred option(s) for T2ST for the purposes of the Gate 2 submission. This report is Stage 8 of the route and site selection process.

1.1.3 This work builds on the completed Options Appraisal (Gate 2 Report Annex A1) which identified options for potable water transfers from either SESRO and/or Severn Thames Transfer, or from the River Thames between Pangbourne and Reading, both transferred to Southern Water's Winchester Water Resource Zone (WRZ) with spurs to Kingsclere WRZ and Andover WRZ.

1.1.4 Through the work explained in this report, the Options Appraisal outputs were taken forward through a route corridor and site identification and assessment process, resulting in the identification of preferred option(s) for the purposes of the Gate 2 submission. These preferred options themselves have then been explored in more detail through various Gate 2 submission documents, particularly the Concept Design Report (Gate 2 Report Annex A3), the Planning and Consent Strategy Report (Gate 2 Report Annex G) and the Environmental Assessment Report, Habitats Regulatory Assessment Report, and Strategic Environmental Assessment Report (Gate 2 Report Annexes B1, B2 and B3 respectively).

1.3 Structure of this Report

1.1.5 The structure of the report is summarised below:

- **Section 2: Methodology** – explanation of the methodology followed for the route corridor and site assessment work
- **Section 3: Identification and preliminary assessment of route corridor sections**
- **Section 4: Identification and preliminary assessment of sites**
- **Section 5: Shortlisting and detailed assessment of options**
- **Section 6: Preferred option identification**
- **Section 7: How this work will be taken forward**

1.1.6 The report is supported by appendices, as referred to in the text of each section.

2. Methodology

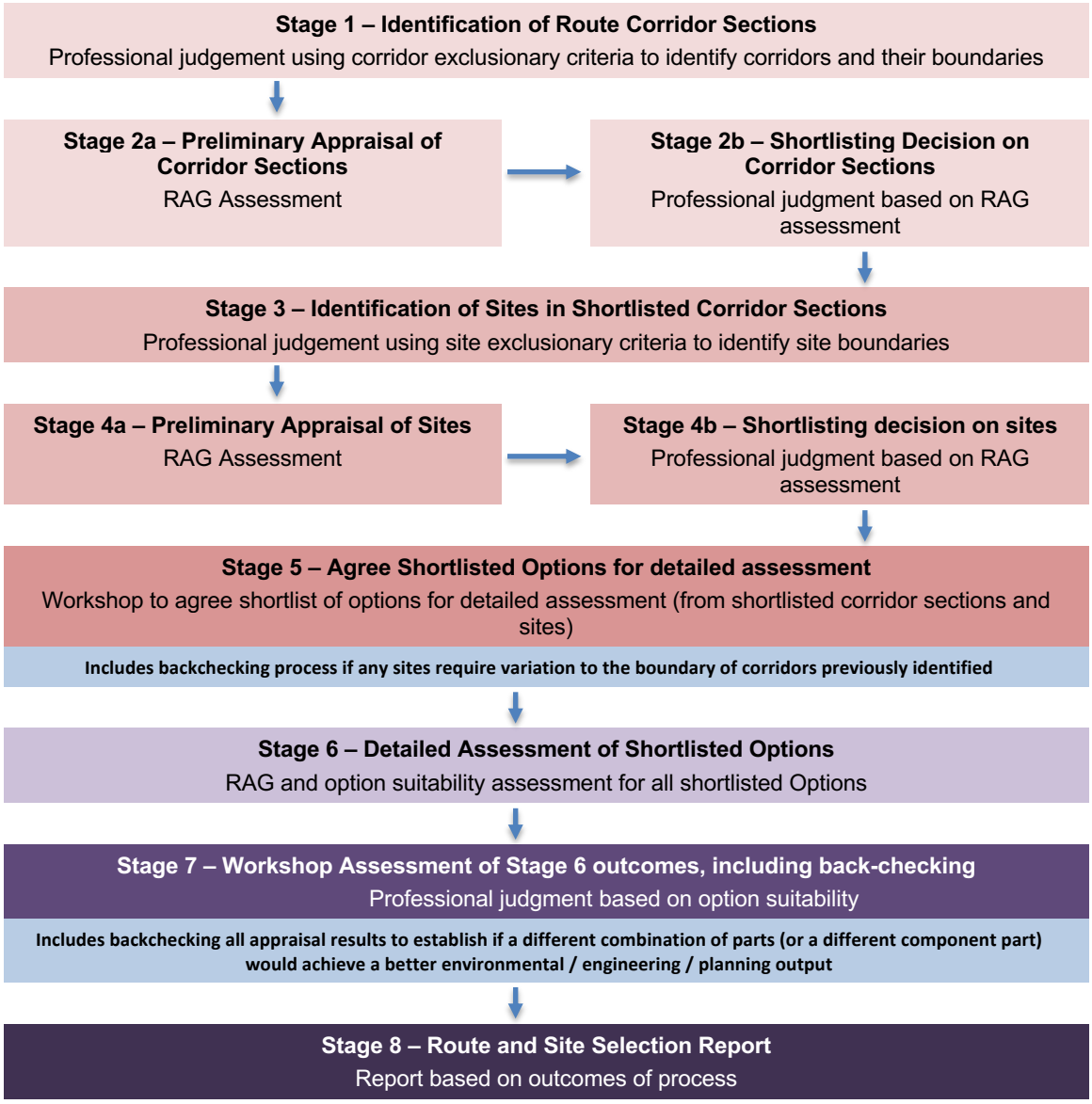
2.1 Overview

2.1.1 The methodology provides a systematic multi-stage process for the identification and assessment of potential pipeline route corridors and sites for the T2ST project, against engineering, environmental, planning and land criteria. The process enables multi-disciplinary assessment and shortlisting of options, with the outcome of the methodology being the identification of T2ST preferred option(s) for the purposes of the Gate 2 submission.

2.2 Methodology summary

2.2.1 The multi-stage methodology is illustrated in the process diagram in figure 2.1 below.

Figure 2.1 Route Corridor and Site Appraisal Methodology



2.2.2 Stages 1 and 2 follow a sequential method through which initial pipeline route corridor sections are identified and screened against core land use, planning and environmental criteria that are capable of facilitating, repositioning or preventing corridors from progressing. This assessment focuses on corridors first (Stages 1 and 2) then sites (Stages 3 and 4) to avoid potentially abortive work on sites for corridors that are not shortlisted.

2.2.3 Overarching criteria are used in **Stage 1** to define the initial route corridors available to the project. By avoiding key constraints and designations where possible, the process looks to ensure that selected corridors avoid as far as practicable constraints and designations likely to present significant challenges to securing necessary consents for development.

2.2.4 The preliminary appraisal of corridors (**Stage 2a**) focusses in on criteria drawn from overarching national policy objectives or derived from engineering requirements and known environmental limitations that inform the project's design. Through this approach this stage provides the information to enable corridors judged unlikely to be able to proceed to be identified. A 'RAG' grading process is applied to each criterion, and a commentary is provided documenting the opportunities and constraints that have been identified. The outcome of this work is a recommendation for each corridor or section of a corridor, resulting in **Stage 2b** in a shortlist of corridors.

2.2.5 Stages 3 and 4 then repeat the processes undertaken for corridors in Stages 1 and 2, but this time focusing on sites necessary for the permanent above and below ground infrastructure associated with the shortlisted corridors. This includes the identification (**Stage 3**) and preliminary appraisal (**Stage 4a**) of sites for infrastructure including inlet screens, pumping stations, break pressure tanks and water treatment works. The outcome of this work is a recommendation for each site assessed, resulting in **Stage 4b** a shortlist of sites.

2.2.6 **Stage 5** then takes the outcomes of Stages 1 to 4 (shortlisted corridors and shortlisted sites) and assembles different combinations of the corridors and sites together to form a complete T2ST Option. Options are expected to include some common sections of pipeline corridors, but with sub-options providing different corridor routes around constraints and designations, or utilising different sites for above and below ground permanent infrastructure. There may be a need for back-checking at this stage to ensure the boundaries of corridors and sites align. Decisions will be made at this point which options are to be shortlisted and taken forward for detailed assessment.

2.2.7 **Stage 6** of the process undertakes a detailed assessment of the shortlisted options, applying criteria, with a RAG grading utilised, and including consideration of likelihood of securing necessary mitigation for impacts. The detailed assessment and RAG are drawn together, summarising the key opportunities and constraints faced by that Option.

2.2.8 **Stage 7** is a multi-disciplinary workshop based assessment of the outcomes of Stage 6, designed to ensure that the outcomes are carefully reviewed to ensure all options are considered comparatively, with the results robustly tested. This workshop also informs the Route and Site Selection Report (this report), which comprises the final **Stage 8** of the process.

3. Identification and preliminary assessment of route corridor sections (stages 1 to 2b)

3.1 Stage 1 – Identification of Route Corridors

3.1.1 Taking the outcomes of the T2ST Options Appraisal which considered abstraction locations and pipeline route options (as reported in the Gate 2 Report Annex A1), at Stage 1 the project team used a GIS based system to map environmental and other designations, applying exclusionary criteria to seek to avoid and take account of key constraints and designations, to define potential pipeline corridor sections for assessment.

3.1.2 Corridor sections were identified from the two potential source locations (identified through the Options Appraisal), land west of the A34 at Drayton in Oxfordshire, and land between Reading and Pangbourne. The location west of the A34 at Drayton would provide a connection to infrastructure associated with either or both of SESRO (reservoir) or the Thames to Southern Transfer (canal or pipeline transfer). The abstraction location between Reading and Pangbourne would provide a new abstraction from the River Thames. The destinations for the pipeline in Hampshire are connection points to existing Southern Water infrastructure in the Andover, Kingsclere and Winchester Water Resource Zones (WRZs).

3.1.3 The corridor sections vary in width significantly, according to the environmental designations and constraints adjoining the corridor sections. Where there are adjoining environmental designations the corridors were narrowed to seek to avoid impacts. Where there is a relative lack of adjoining designations, the corridors are kept wide to retain flexibility for future detailed investigation of pipeline alignments (beyond Gate 2). The overarching criteria used for the identification of pipeline corridor sections are identified in Table 3.1 below.

Table 3.1 Stage 1 Pipeline Corridor Identification: Overarching Criteria

Item	Explanation
Buildings and settlements	The pipeline will avoid routing beneath any existing permanent buildings. The pipeline will seek to avoid existing settlements (from village scale to city scale) to reduce conflict with existing assets, and buildings. Where pipeline corridors are routed through settlements, they will seek to minimise likely impacts through route selection.
Ancient Woodland	The pipeline will seek to avoid being routed within any areas of mapped (above 1ha) Ancient Woodland. Where unavoidably the pipeline is routed within Ancient Woodland, trenchless pipeline construction will be proposed and locations to support construction activity will seek to be sited at least 15m away from the woodland extent.
Scheduled Monuments	The pipeline will not be routed beneath any Scheduled Monuments. Where any pipeline corridors are routed near to Ancient Monuments they will seek to minimise likely impacts through route selection.
AONB and National Park	At least one pipeline corridor that avoids impacts on the AONB and National Park will be identified and assessed. Where any pipeline corridors are routed through the AONB and National Park they will seek to minimise likely impacts through route selection.

Item	Explanation
Environmental designations	The pipeline will seek to avoid routing within any International and National biodiversity designations (Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar, National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI), Local Nature Reserve (LNR)). Where this is unavoidable, trenchless pipeline construction will be proposed and locations to support construction activity will seek to be sited away from the designated site to minimise likely impacts.
Existing infrastructure and main river crossings	The pipeline route will seek to minimise the number of individual crossings of existing major infrastructure (railways, motorways, trunk roads, high pressure mains, and main rivers).
Flood zone	The pipeline will seek to avoid being routed within Flood Zone 3 for River and Sea flooding, or within areas of High Risk of surface water flooding. Where this is unavoidable, construction mitigation measures will need to be adopted.

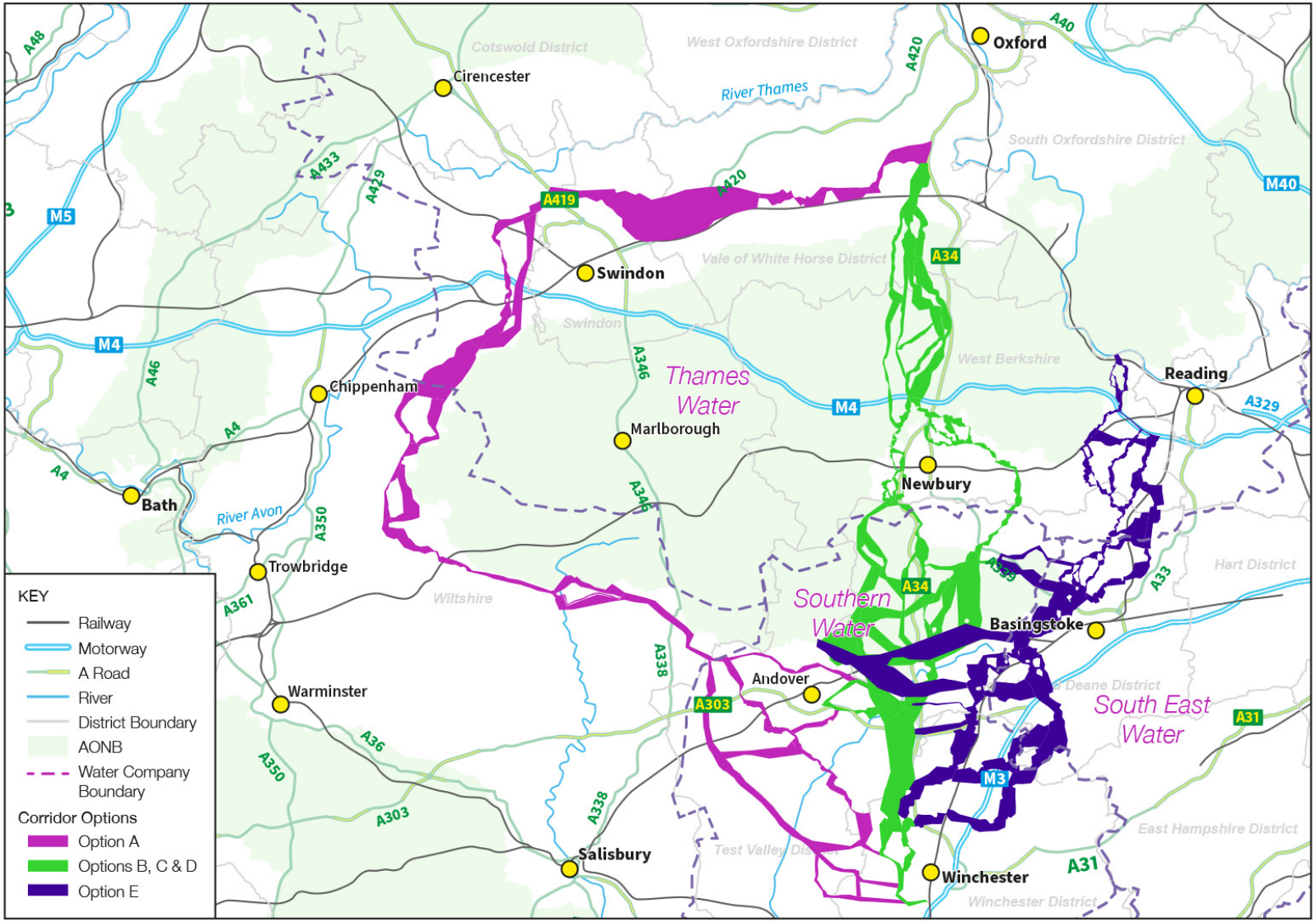
3.1.4 Over 100 individual potential corridor sections were identified for assessment by the project team and mapped in the GIS system. These covered a number of different routeings from the sources in Oxfordshire and Berkshire to the destinations in Hampshire, including corridor sections seeking to route around and avoid impacts on the North Wessex Downs AONB. Broadly, the corridor sections could be grouped into:

- A western route, with the corridor sections extending from west of the A34 at Drayton west beyond Swindon (to avoid the AONB) and returning east to the destination WRZs in Hampshire (this became pipeline corridor A).
- A central route, with the corridor sections extending from west of the A34 at Drayton southwards towards Newbury and then on to the destination WRZs in Hampshire (this became pipeline corridors B, C and D).
- An eastern route, with the corridor sections extending from between Reading and Pangbourne, south-west towards Basingstoke, and then on to the destination WRZs in Hampshire (this became pipeline corridor E).

3.1.5 Figure 3.1 below provides a summary plan of the potential pipeline corridor sections.

3.1.6 In identifying the corridor sections the project team considered the potential for additional corridor routes further to the east or west to be identified and assessed. The conclusion reached was that the identified corridors were sufficiently varied to represent a range of viable routeings for the pipeline corridor. Additional corridors further east or west would increase the pipeline corridor length, and be expected to lead to additional engineering and environmental constraints being encountered. The identification of additional corridors at this stage would increase the complexity and number of assessments required, with no material planning, environmental, engineering or property benefit to the Gate 2 submission. This conclusion will be kept under review as part of work beyond Gate 2.

Figure 3.1 - Stage 1 potential pipeline corridor sections



3.2 Stage 2a and 2b – Preliminary Assessment of Route Corridor Sections and Shortlisting

3.2.1 The preliminary appraisal of corridors (Stage 2a) focusses in on criteria drawn from overarching national policy objectives or derived from engineering requirements and known environmental limitations that inform the project's design. Through this approach this stage provides the information to enable corridors judged unlikely to be able to proceed to be identified. A 'RAG' (Red, Amber, Green) grading process is applied to each criterion, and where necessary comments recorded to explain the opportunities and constraints that have been identified.

3.2.2 The criteria against which individual corridors were graded are set out in Appendix 1. The criteria include thresholds and distances that were devised based on professional judgement and best practice from other pipeline and linear infrastructure projects. The broad thresholds and distances are used to identify constraints and features relevant to the different corridor sections and corridors. Decision making between corridor sections and corridors is not triggered by performance against any individual criteria (i.e. a red assessment does not automatically mean that a corridor section is rejected), instead decisions are based on an assessment of performance against the set of criteria as a whole. This is considered to be a robust approach for this Gate 2 assessment work, and the adoption of different thresholds or distances is not considered to be likely to lead to any materially different outcomes.

3.2.3 Professional engineering, land, planning and environment advisors within the project team evaluated each corridor section through a desk top assessment. Professional judgement was applied to the information held in the GIS system, and in other publicly available data sources.

3.2.4 The outcome of the Stage 2a work was a RAG assessment for each of the corridor sections identified in Stage 1. As part of the work, regular back-checking was undertaken. Where sections of a route corridor were judged to encounter substantial adverse impacts, potential alternative corridor sections in the vicinity were identified and then subjected to the RAG assessment.

3.2.5 At Stage 2b, the T2ST Engineering, Environmental and Planning teams undertook a series of online workshop sessions to collaboratively shortlist the route corridor sections using the RAG scoring and associated commentary from Stage 2a. The decisions to either shortlist or hold back a corridor section were recorded. In a number of instances, decisions were taken to split a corridor section, shortlisting part of it but holding back another part. In these cases, the corridor section was split into two, and renumbered accordingly.

4. Identification and preliminary assessment of sites (Stages 3 to 4b)

4.1 Stage 3 – Identification of Sites

4.1.1 On a similar basis to the work undertaken for corridor sections in Stage 1, at Stage 3, the project team used the GIS based system to define potential sites for above and below ground infrastructure associated with the shortlisted pipeline corridor sections. The infrastructure that potential sites were required to be identified for included:

- for a river abstraction, intake structure, screens and pumping station
- water treatment works, for treating raw water before transfer through the pipeline
- pumping stations and break pressure tanks associated with the pipeline

4.1.2 Sites were identified using the mapped environmental and other designations and then applying overarching criteria to seek to avoid and take account of key constraints and designations. The overarching criteria used are identified in Table 4.1 below.

Table 4.1 Stage 3 site identification overarching criteria

Item	Explanation
Buildings and settlements	Sites for above ground infrastructure will seek to avoid existing settlements (from village scale to city scale) to reduce conflict with existing assets, utilities and buildings, unless alternative sites are not feasible.
Ancient Woodland	Sites for above ground infrastructure will avoid being sited within any areas of mapped (above 1ha) Ancient Woodland. Locations to support construction activity will seek to be sited at least 15m away from the woodland extent.
Scheduled Monuments	Sites for above ground infrastructure will seek to avoid being sited in locations which will impact upon the setting of any Scheduled Monuments. Locations to support construction activity will seek to be sited away from any Scheduled Monuments to minimise likely impacts.
AONB and National Park	Technically feasible sites for above ground infrastructure that avoid impacts on the AONB and National Park will be identified and assessed. Where sites must be located within the AONB or National Park to be technically feasible they will seek to minimise likely impacts through site selection.
Environmental designations	Above ground infrastructure will not be sited within any International and National biodiversity designations. Locations to support construction activity will seek to be sited away from the designated site to minimise likely impacts.
Flood zone	The above ground infrastructure will seek to avoid being sited within Flood Zone 3 for River and Sea flooding, or within areas of High Risk of surface water flooding.

4.1.3 The potential sites were identified for assessment by the project team and mapped in the GIS system.

4.1.4 In identifying the potential sites, the project team considered whether a greater number of sites should be identified and assessed. The identification of additional sites at this stage would increase the complexity and number of assessments required, with no material planning, environmental, engineering or property benefit to the Gate 2 submission. This conclusion will be kept under review as part of work beyond Gate 2.

4.2 Stage 4a and 4b – Preliminary Assessment of Sites and Shortlisting

4.2.1 At Stage 4a the T2ST Engineering, Environmental and Planning teams undertook a desk based assessment of the sites identified in Stage 3 of the methodology. This was achieved using a Red Amber Green (RAG) spreadsheet assessment matrix to record the assessment against pre-determined engineering, environment and social, planning and land criteria. Where necessary, comments relating to the RAG assessment were recorded alongside the matrix.

4.2.2 The criteria used are identified in Appendix 2. The criteria include thresholds and distances that were devised based on professional judgement and best practice from other pipeline and linear infrastructure projects. The broad thresholds and distances are used to identify constraints and features relevant to the different sites. Decision making between sites is not triggered by performance against any individual criteria (i.e. a red assessment does not automatically mean that a site is rejected), instead decisions are based on an assessment of performance against the set of criteria as a whole. This is considered to be a robust approach for this Gate 2 assessment work, and the adoption of different thresholds or distances is not considered to be likely to lead to any materially different outcomes.

4.2.3 The outcome of the Stage 4a work was a RAG assessment. In some cases the assessment work undertaken indicated that a site had constraints relating to it such that an additional or alternative site was needed. In these instances, the project team used the Stage 3 process to identify a new site, and then undertook an assessment of it using the Stage 4a RAG assessment process.

4.2.4 At Stage 4b, the T2ST Engineering, Environmental and Planning teams undertook an online workshop session to collaboratively shortlist the sites using the RAG scoring and associated commentary from Stage 4a. The decisions to either shortlist or hold back a site were recorded.

5. Shortlisting and detailed assessment of options (Stages 5 to 6)

5.1 Stage 5 and 6 – Agree Shortlisted Options for Detailed Assessment, and Detailed Assessment of the Options

5.1.1 At Stage 5, utilising the shortlisted corridor options and sites, from Stages 2b and 4b, a number of individual T2ST Options were formed by the project team in an online workshop.

5.1.2 An option is a complete T2ST scheme – from the source of water west of the A34 at Drayton in Oxfordshire, or the River Thames between Reading and Pangbourne in Berkshire, through to its destination near Winchester in Hampshire, with associated spurs to serve the Kingsclere and Andover Water Resource Zones (WRZ). The options and corridor sections also included potential sites for water treatment works, pumping stations and break pressure tanks.

5.1.3 In selecting corridor sections and sites to form part of the Options, where a choice of comparable corridor sections was available without distinguishing differences in terms of environmental or other constraints, the project team selected the corridor section that provided the most direct or shortest overall corridor length. For some of the Options this resulted in a single pipeline corridor available, whereas for others there could be two alternative routes within a particular part of the overall corridor (but any alternatives were not considered so different as to represent a separate option).

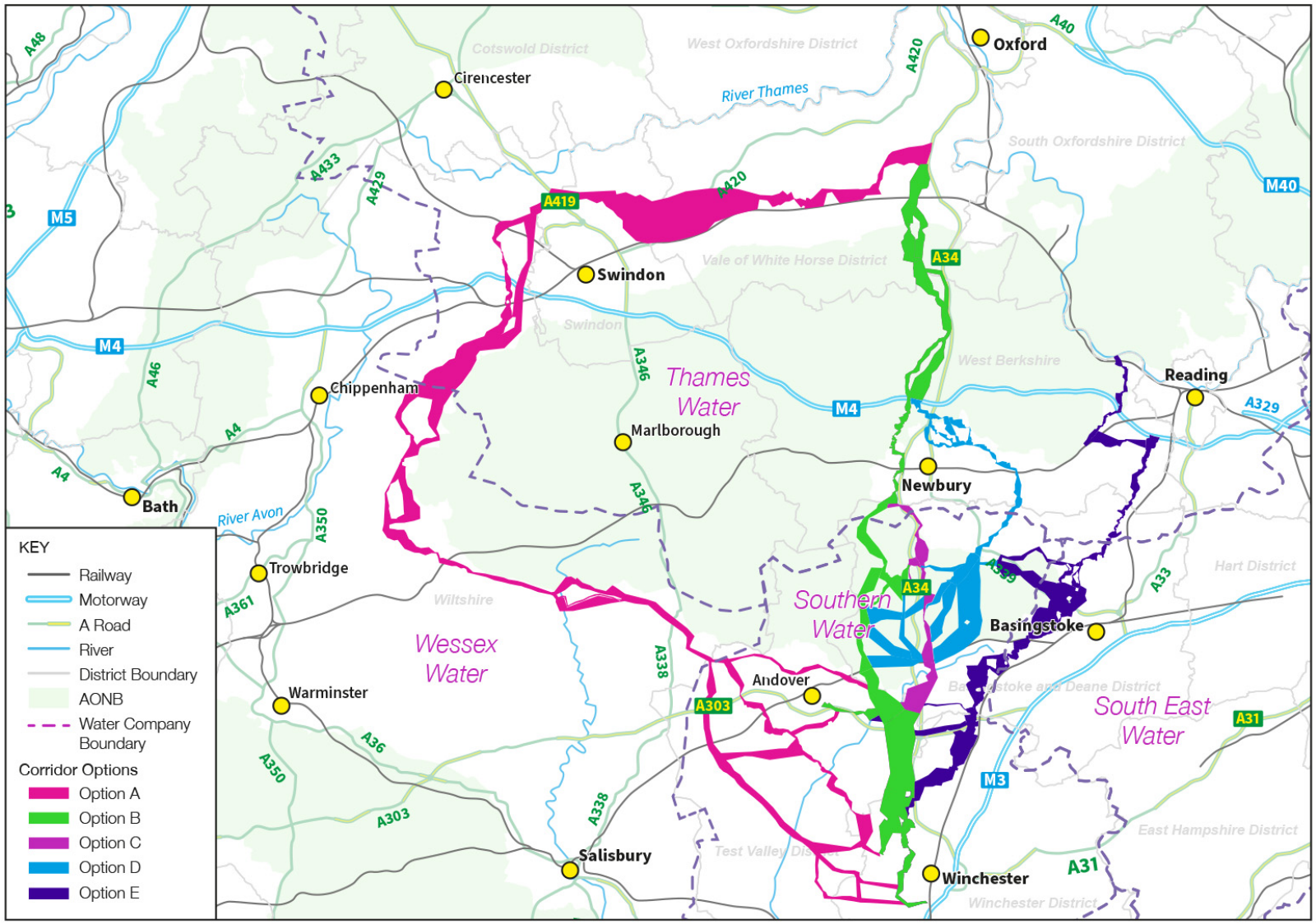
5.1.4 This work resulted in five potential Options being identified, summarised below:

- Option A – route from west of the A34 at Drayton (Oxfordshire), west around Swindon to avoid the majority of the AONB, to Winchester (with spurs to Kingsclere and Andover WRZ)
- Option B – route from west of the A34 at Drayton (Oxfordshire) southwards, passing to the West of Newbury and remaining west of the A34, to Winchester (with spurs to Kingsclere and Andover WRZ)
- Option C - route from west of the A34 at Drayton (Oxfordshire) southwards, passing to the West of Newbury and then crossing over the A34, to Winchester (with spurs to Kingsclere and Andover WRZ)
- Option D - route from west of the A34 at Drayton (Oxfordshire) southwards, passing to the East of Newbury and then crossing over the A34, to Winchester (with spurs to Kingsclere and Andover WRZ)
- Option E – route from the River Thames between Reading and Pangbourne, south westwards via Basingstoke, to Winchester (with spurs to Kingsclere and Andover WRZ)

5.1.5 Each of these options is identified on the plan in Figure 5.1 below.

5.1.6 For each of the Options, a summary description of the component parts (corridor sections and sites) was compiled by the project team, including the infrastructure necessary as part of each option. Then, in a workshop session, using the RAG assessment outcomes from Stage 2a/b and 4a/b assessments of corridor sections and sites, and the summary descriptions for the Options, the project team determined which of the Options should be shortlisted for more detailed assessment. The decision whether to shortlist an Option or to hold it back was based on the key factors and risks relating to each option.

Figure 5.1 - Plan of the five potential T2ST Options (A to E)



5.1.7 As a result of the project team workshop session, the following decisions were taken on the Options.

Option	Shortlist decision
A	Not shortlisted – option held back
B	Shortlisted for detailed assessment in Stage 6
C	Shortlisted for detailed assessment in Stage 6
D	Not shortlisted – option held back
E	Shortlisted for detailed assessment in Stage 6

5.1.8 Options A and D were held back at this stage, based on the key factors and risks associated with these options. These decisions were taken in full knowledge of the policy requirements relating to major development in the AONB, including that the need for such development should be exceptional, including in the national interest, and that the cost of and scope for developing elsewhere, outside the AONB or meeting the need in some other way, must be demonstrated.

5.1.9 For Option A, whilst this option sought to avoid pipeline routeing through the AONB, by adopting a route west of Swindon, this led to a significantly longer pipeline corridor route than for the other Options (including spurs, approximately 170km, compared to approximately 90-95km for Options B to E). This additional length involves additional engineering, environment and social and planning and land constraints and issues compared to the shorter options. This includes a higher number of major infrastructure and river crossings, and greater lengths of corridor in close proximity to environmental designations and constraints, with consequential higher risks of environmental and other impacts, increased engineering complexity and risk, and potentially higher levels of mitigation. Additional to this, there are acquisition and construction risks associated with MoD land through which the Option A corridor is routed (including parts of Salisbury plain). There is also the risk of potential future development within the corridor pushing the pipeline even further west, particularly in sections within Wiltshire, further increasing pipeline corridor lengths to avoid them.

5.1.10 Even routeing Option A to the west of Swindon to avoid the AONB, there would still be a requirement for a length of pipeline to be constructed within the AONB to provide the spur connection to the Kingsclere WRZ. As a result, impacts on the AONB could not be completely avoided by this option, although they would be reduced when compared to Options B, C and D due to the shorter length of pipeline construction within the AONB. Notwithstanding the planning policy benefit of reduced pipeline length within the AONB, the combination of constraints and risks outlined above were considered to overweigh the policy benefit, and were relevant factors in the decision to hold back this option. This position is consistent with that accepted as part of the consenting of other major linear infrastructure schemes (e.g. the Southampton to London Pipeline DCO), where a longer route avoiding nationally designated landscape was rejected and a route through the designated landscape was accepted.

5.1.11 For Option D, this corridor was devised to the East of Newbury to seek to reduce the length of pipeline within the AONB, compared to Options B and C. Whilst a shorter pipeline length in the AONB could be achieved through this option, the consequence of corridor D routeing to the East of Newbury is an overall longer pipeline (including spurs, approximately 102km compared to 93-94km for Options B and C), with consequential additional engineering, environment and social and planning and land constraints and issues compared to the shorter options. This includes a higher number of major infrastructure crossings, and greater lengths of narrow corridor widths due to close proximity to environmental designations and local communities, with consequential higher risks of environmental and other impacts, increased engineering complexity and risk, and potentially higher levels of mitigation.

5.1.12 Option D also carries significant delivery risks associated with the as yet draft plans for the north east expansion of Thatcham, which if confirmed would effectively block the route in this location. These risks, combined with the lack of advantages over other Options (B, C or E) were relevant factors in the decision to hold back this option, notwithstanding the shorter pipeline length within the AONB.

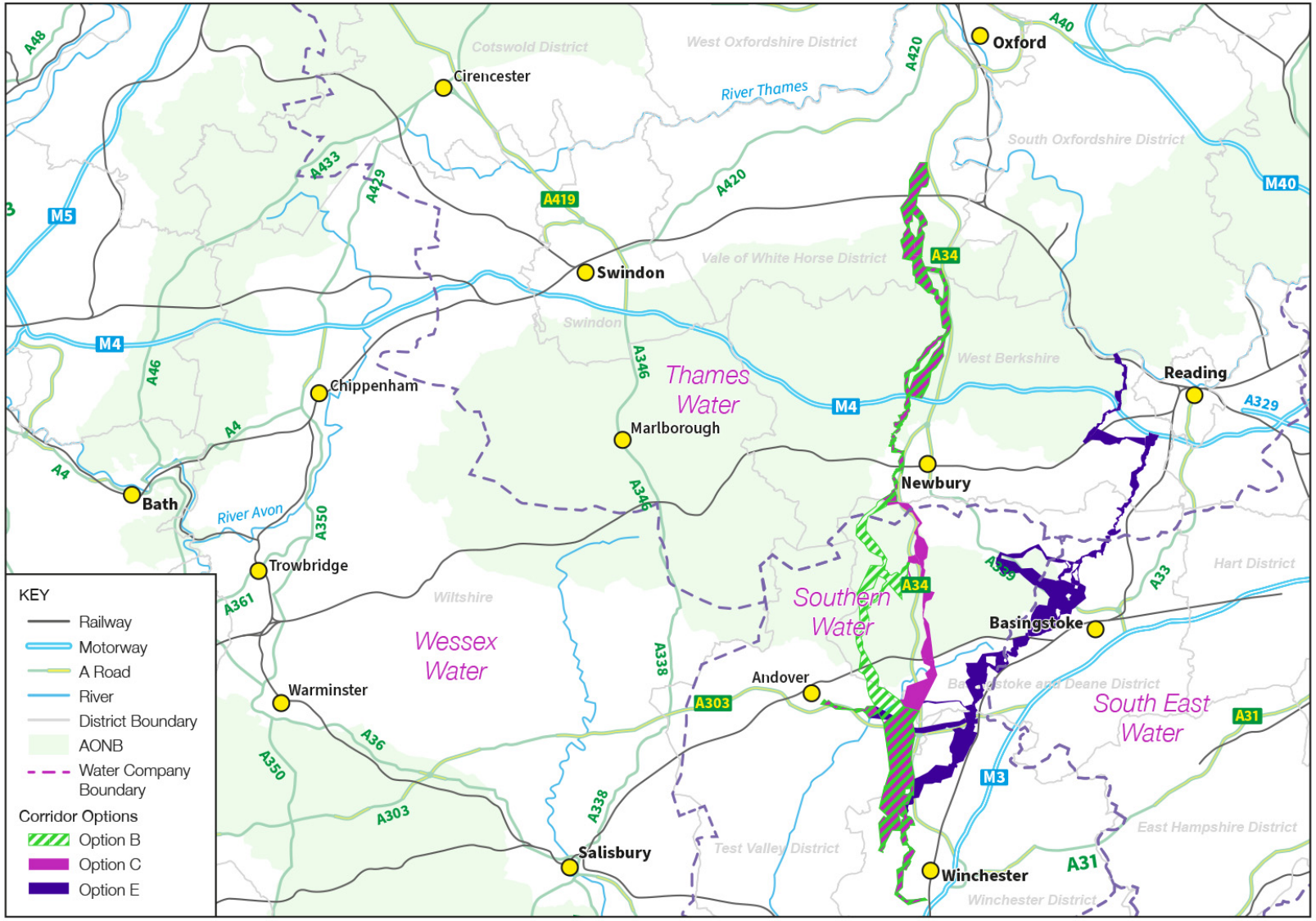
5.1.13 On the basis of the consideration at this stage, Options B, C and E were shortlisted for more detailed assessment as the key factors and risks for each option did not indicate that they should be held back at this stage. The three shortlisted options are illustrated in the plan in Figure 5.2 below.

5.1.14 Following the shortlisting of the options, in Stage 6 the project team reviewed the RAG assessments for the three shortlisted options, using professional judgement to consider the relative suitability of the options on a comparative basis. This included assessing the engineering, environment and social, planning and land factors and risks associated with the options, as the basis for the subsequent identification of a preferred option in Stage 7.

5.1.15 As a result of further engagement with Thames Water and Southern Water through this stage of work, variations to the location of connection points to the Kingsclere and Andover WRZs were raised and incorporated into the route corridor and site assessment process. The result of this was the Kingsclere connection point moving to near Beacon Hill for Options B and C, but remaining at Kingsclere for Option E. The connection point at Andover ultimately remained as previously identified.

5.1.16 A backchecking and review process was undertaken as part of this work. New or amended corridor sections and sites were identified where further assessment work noted constraints and issues not previously identified, or opportunities for less constrained corridors and sites to be identified. These additional pipeline corridor sections (identified in a process consistent with Stage 1), and sites (identified in a process consistent with Stage 3), then had RAG assessments completed for them (consistent with Stage 2a for corridor sections and 4a for sites). Following a back-checking exercise to ensure that the new or amended sections and sites did not alter previous overall assessments of the Options, these were then incorporated within the Options identified at Stage 5 and the Stage 6 assessments were completed on the basis of the options as amended.

Figure 5.2 - Plan of the three options shortlisted at Stage 5



5.1.17 The project team also undertook a back-checking process of the shortlisting decisions undertaken at Stages 3 and 5, reviewing whether amendments to shortlisted options led to any of the previously completed shortlisting or hold back decisions needing to be revisited. The conclusion was that they did not.

6. Preferred option identification (Stages 7 to 8)

6.1 Context

6.1.1 Stages 7 and 8 are the final stages of the process. Stage 7 comprises a workshop to consider assessment outcomes, leading to the identification of the preferred option. Stage 8 is the reporting of the results.

6.1.2 The workshop is described in section 6.2 below, with the preferred option identification in Section 6.3. The reporting is described in section 6.4.

6.2 Stage 7 – workshop to review shortlisted options

6.2.1 At Stage 7, the T2ST Engineering, Environmental and Planning teams undertook an online workshop session to collaboratively review the Stage 6 assessments of the three shortlisted options, using the RAG scoring and option suitability information from Stage 6. Engineering, environmental and planning constraints were assessed with equal weighting.

6.2.2 This workshop resulted in the following conclusions being reached on each of the 3 remaining Options.

Option B (route from west of the A34 at Drayton (Oxfordshire) southwards, passing to the West of Newbury and remaining west of the A34, to Winchester (with spurs to Kingsclere and Andover WRZ))

6.2.3 For Option B, the, following conclusions were reached on the option.

Environment & Social	The routeing for Option B avoids a large number of environmental designations and communities along its route. Option B crosses the River Lambourn SAC, the River Kennet SSSI and the River Test SSSI, which cannot be avoided. This option includes ancient woodlands, a battlefield, 5 scheduled monuments and a registered park and garden, which can be avoided with pipeline placement within the identified corridor. This option crosses an authorised landfill (Cliffeville) which could be avoided with pipeline placement but could be difficult. This option crosses multiple flood zone areas, some of which cannot be avoided through pipeline placement. Much of Option B is within the North Wessex Downs AONB, which cannot be avoided. Potential mitigation can include tunnelling under the River Lambourn SAC, the River Kennet SSSI and the River Test SSSI; maintaining minimum 100m between the pipeline route and other designations such as ancient woodland, scheduled monuments, registered park and garden; and choosing a pipeline alignment that crosses areas of lower sensitivity of the AONB.
Engineering	Option B comprises a treated water transfer from a connection to SESRO or STT on land west of the A34 at Drayton to existing water supply reservoirs near Winchester in Hampshire. The scheme will also include branch connections to water supply reservoirs within the Kingsclere and Andover WRZs. At this stage, a range of scheme capacities is being considered at 50, 80 and 120Ml/d, with final scheme size and programme dependent on the outcome of the WRSE regional plan modelling in summer 2022. The transfer route runs south from the source connection on land to the west of A34 at Drayton, keeping west of the A34 to Newbury, and then passing west of Highclere. The route then passes to the east of Andover and terminates at existing water supply reservoirs to the west of Winchester. Key engineering components of the option include a new water treatment works and pumping station on land to the west of Drayton, 2No. intermediate break pressure tank locations and 3No. intermediate pumping station sites. The scheme includes connections to 4No. existing water supply reservoirs in Hampshire, within the Kingsclere, Andover and Winchester WRZs. As part of the engineering assessment, hydraulic analyses were undertaken to determine preliminary locations for break pressure tanks and pumping stations, pumping station power ratings, pressure head, pipeline diameter and flow velocity. This included development of preliminary pipeline alignments through the pipeline corridors and long sections of the pipeline route topography, to enable these assessments to be made. The transfer pipeline will cross a number of major roads, railways and watercourses where trenchless technology (pipe jacking and/or micro tunnelling) will be adopted to create a tunnel beneath the surface features through which the water pipeline will be installed. The number of tunnelled crossings was determined for each option including locations of launch and reception shafts to confirm total tunnelled lengths. The constructability of each option in terms of site access, flood risk and ground conditions was also considered. Three phase power supplies will be required at the water treatment works and the intermediate pumping station sites.

Planning	The key planning constraint affecting Option B is the North Wessex Downs AONB. The option requires significant length of main pipeline (and spurs) within the AONB, as well as a break pressure tanks and pumping stations. The main water treatment works infrastructure would, however be located some distance outside of the AONB). Planning policy requires the Secretary of State to "*refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that the development is in the public interest*". On the basis of the information currently available it is considered that exceptional circumstances are likely to be capable of being demonstrated (including the buried nature of the pipeline and predominately temporary nature of construction impacts). More detailed environmental, engineering and social, planning and land assessments will be undertaken before and beyond Gate 2. Beyond Gate 2 these could appropriately focus on routeing within the shortlisted corridor through the AONB, and finer positioning of the necessary above ground infrastructure within it. There are a number of other environmental constraints and designations that could be directly or indirectly impacted by Option B, which planning policies would seek to protect from harm. These include crossings of an SSSI, main rivers, and Option B's corridor including or lying adjacent to designated sites. As part of the more detailed assessments to be undertaken before and after Gate 2, it is considered likely that appropriate engineering design and environmental mitigation could be devised and would be capable of being adopted to minimise impacts to a level acceptable in terms of planning policy. By its routeing, Option B avoids most of the areas on the periphery of larger settlements where development pressure, principally for residential development, has the potential to further constrain the shortlisted corridor. This is particularly the case for the spur into Andover from the south and to a more limited extent on the periphery of Winchester. Future development proposals will need to be kept under review. The overall planning conclusion is that on the basis of the available information, a T2ST scheme based on Option B is likely to be consentable.
Land	Given the time scales for the delivery of the project, detailed land investigations such as land referencing is not being undertaken for T2ST at this stage. A limited desk based review of public information sources on land ownership and categorisation has been undertaken, from which the following conclusions can be reached. Option B avoids National Trust land but has one area of MoD land that the corridor passes through. There is at least one area of common land in Hampshire which the corridor includes. Rural parts of Oxfordshire, Berkshire and Hampshire include a number of equestrian businesses and large rural estates and the corridor intersects a number of these. As noted above, by its routeing, Option B avoids most areas on the periphery of larger settlements where land values associated with future residential development could be high. On the basis of the above, whilst there are land issues to be explored further beyond Gate 2, including the acquisition of land for permanent above ground infrastructure, the land issues are not considered to be more complex than would be expected for a scheme of this scale.

6.2.4 From the above, if the option is taken forward as a preferred option then further work beyond Gate 2 on Option B could include:

- Finer grain location and siting of break pressure tanks and pumping stations to minimise impact on designated sites, including the North Wessex Downs AONB;
- More detailed assessments to inform routeing of the transfer pipeline to minimise impact on designated sites including the North Wessex Downs AONB;
- Finer grain location and construction techniques adoption (including mitigation) for crossings of the River Lambourn SAC, River Kennet SSSI and River Test SSSI;
- Targeted land referencing to inform land acquisition risks for above ground infrastructure sites;
- Engagement with local planning authorities to continue assessment of the potential for future housing development to constrain identified pipeline routes and above ground infrastructure sites.

Option C (route from west of the A34 at Drayton (Oxfordshire) southwards, passing to the West of Newbury and then crossing over the A34, to Winchester (with spurs to Kingsclere and Andover WRZ))

6.2.5 For Option C, the following conclusions were reached on the option.

Environment & Social	The routeing for Option C avoids a large number of environmental designations and communities along its route. Option C crosses the River Lambourn SAC, the River Kennet SSSI, and the River Test SSSI which cannot be avoided. This option crosses Bere Mills SSSI which could be avoided with pipeline placement but would be difficult. Option C includes ancient woodlands, 4 scheduled monuments and a registered park and garden, which can be avoided with pipeline placement. This option crosses multiple flood zone areas, some of which cannot be avoided through pipeline placement. Much of Option C is within the North Wessex Downs AONB, which cannot be avoided. Potential mitigation can include tunnelling under the River Lambourn SAC, the River Kennet SSSI, the River Test SSSI and the Bere Mills SSSI; maintaining minimum 100m between the pipeline route and other designations such as ancient woodland, scheduled monuments, registered park and garden; and choosing a pipeline alignment that crosses areas of lower sensitivity of the AONB.

Engineering	Option C is similar to Option B apart from a route variation to the east of Highclere. Option C comprises a treated water transfer from a connection to SESRO or STT on land west of the A34 at Drayton to existing water supply reservoirs near Winchester in Hampshire. The scheme will also include branch connections to water supply reservoirs within the Kingsclere and Andover WRZs. At this stage a range of scheme capacities is being considered at 50,80 and 120Ml/d, with final scheme size and programme dependent on the outcome of the WRSE regional plan in summer 2022. The transfer route runs south from the source connection on land to the west of the A34 at Drayton, keeping west of the A34 to Newbury, and then passing east of Highclere. The route then passes to the east of Andover and terminates at existing water supply reservoirs to the west of Winchester. Key engineering components of the option include a new water treatment works and pumping station on land to the west of Drayton, 1No. intermediate break pressure tank and 3No. intermediate pumping station sites. The scheme includes connections to 4No. existing water supply reservoirs in Hampshire, within the Kingsclere, Andover and Winchester WRZs. As part of the engineering assessment, hydraulic analyses were undertaken to determine preliminary locations for break pressure tanks and pumping stations, pumping station power ratings, pressure head, pipeline diameter and flow velocity. This included development of preliminary pipeline alignments through the pipeline corridors and long sections of the pipeline route topography, to enable these assessments to be made. The transfer pipeline will cross a number of major roads, railways and watercourses where trenchless technology (pipe jacking and/or micro tunnelling) will be adopted to create a tunnel beneath the surface features through which the water pipeline will be installed. The number of tunnelled crossings was determined for each option including locations of launch and reception shafts to confirm total tunnelled lengths. The constructability of each option in terms of site access, flood risk and ground conditions was also considered. Three phase power supplies will be required at the water treatment works and the intermediate pumping station sites.

Planning	Like Option B, the key planning constraint affecting Option C is the North Wessex Downs AONB. The option requires significant length of main pipeline (and spurs) within the AONB, as well as a break pressure tank and pumping stations. The main water treatment works infrastructure would, however be located some distance outside of the AONB. Planning policy requires the Secretary of State to "*refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that the development is in the public interest*". On the basis of the information currently available it is considered that exceptional circumstances are likely to be capable of being demonstrated (including the buried nature of the pipeline and predominately temporary nature of construction impacts). More detailed environmental, engineering and social, planning and land assessments will be undertaken before and beyond Gate 2. Beyond Gate 2 these could appropriately focus on routeing within the shortlisted corridor through the AONB, and finer positioning of the necessary above ground infrastructure within it. There are a number of other environmental constraints and designations that could be directly or indirectly impacted by Option C, which planning policies would seek to protect from harm. These include crossings of an SSSI, main rivers, and Option C's corridor including or lying adjacent to designated sites. As part of the more detailed assessments to be undertaken before and after Gate 2, it is considered likely that appropriate engineering design and environmental mitigation could be devised and would be capable of being adopted to minimise impacts to a level acceptable in terms of planning policy. Option C seeks to avoid most of the areas on the periphery of larger settlements where development pressure, principally for residential development, has the potential to further constrain the shortlisted corridor. However, there are some locations on the periphery of Andover, Burghclere, Newbury, and to a more limited extent Whitchurch and the periphery of Winchester, where the corridor contains land included within local authority Strategic Housing and Employment Land Availability Assessments (SHELAA). Future development proposals will need to be kept under review. The overall planning conclusion is that on the basis of the available information, a T2ST scheme based on Option C is likely to be consentable.
Land	Given the time scales for the delivery of the project, detailed land investigations such as land referencing is not being undertaken for T2ST at this stage. A limited desk based review of public information sources on land ownership and categorisation has been undertaken, from which the following conclusions can be reached. Option C avoids National Trust land but has one area of MoD land that the corridor passes through. There is at least one area of common land in Hampshire which the corridor includes. Rural parts of Oxfordshire, Berkshire and Hampshire include a number of equestrian businesses and large rural estates and the corridor intersects a number of these. The corridor for Option C includes some land on the periphery of larger settlements where land values associated with future residential development could be high. On the basis of the above, whilst there are land issues to be explored further beyond Gate 2, including the acquisition of land for permanent above ground infrastructure, the land issues are not considered to be more complex than would be expected for a scheme of this scale.

6.2.6 From the above, if the option is taken forward as a preferred option then further work beyond Gate 2 on Option C could include:

- Finer grain location and siting of break pressure tank and pumping stations to minimise impact on designated sites, including North Wessex Downs AONB;
- More detailed assessments to inform routeing of the transfer pipeline to minimise impact on designated sites including the North Wessex Downs AONB;
- Finer grain location and construction techniques adoption (including mitigation) for crossings of the River Lambourn SAC, River Kennett SSSI and River Test SSSI;
- Targeted land referencing to inform land acquisition risks for above ground infrastructure sites;
- Engagement with local planning authorities to continue assessment of the potential for future housing development to constrain identified pipeline routes and above ground infrastructure sites, requiring back-checking and consideration of route and site amendments.

Option E (route from the river Thames between Reading and Pangbourne, south westwards via Basingstoke, to Winchester (with spurs to Kingsclere and Andover WRZ))

6.2.7 For Option E, the following conclusions were reached on the option.

Environment & Social	The routeing for Option E avoids a large number of environmental designations and communities along its route. Option E crosses the River Test SSSI, various areas of ancient woodland and a historic landfill, which cannot be avoided. This option includes ancient woodlands, an authorised landfill, 2 scheduled monuments and a registered park and garden, which can be avoided with pipeline placement. This option crosses multiple flood zone areas, some of which cannot be avoided through pipeline placement. Some sections of Option E are within the North Wessex Downs AONB, which cannot be avoided. Potential mitigation can include tunnelling under the River Test SSSI and the areas of ancient woodland; maintaining minimum 100m between the pipeline route and other designations such as ancient woodland, scheduled monuments, registered park and garden; and choosing a pipeline alignment that crosses areas of lower sensitivity of the AONB.

Engineering	Option E comprises a treated water transfer from a new river abstraction from the River Thames between Reading and Pangbourne to existing water supply reservoirs near Winchester in Hampshire. The scheme will also include branch connections to water supply reservoirs within the Kingsclere and Andover WRZs. At this stage a range of scheme capacities is being considered at 50,80 and 120Ml/d, with final scheme size and programme dependent on the outcome of the WRSE regional plan in summer 2022. The transfer route runs south from the river abstraction located on the south bank of the River Thames between Reading and Pangbourne. From Pangbourne the route passes through Theale, passing east of Burghfield and Mortimer Common and west of Basingstoke. The route then passes to the east of Whitchurch and terminates at existing water supply reservoirs to the west of Winchester. Key engineering components of the option include a new river intake and pumping station on the south bank of the River Thames between Reading and Pangbourne, a water treatment works located adjacent to the River Kennet at Theale, and 2No. intermediate pumping station sites. The scheme includes connections to 4No. existing water supply reservoirs within Hampshire, within the Kingsclere, Andover and Winchester WRZs. As part of the engineering assessment, hydraulic analyses were undertaken to determine preliminary locations for break pressure tanks and pumping stations, pumping station power ratings, pressure head, pipeline diameter and flow velocity. This included development of preliminary pipeline alignments through the pipeline corridors and long sections of the pipeline route topography, to enable these assessments to be made. The transfer pipeline will cross a number of major roads, railways and watercourses where trenchless technology (pipe jacking and/or micro tunnelling) will be adopted to create a tunnel beneath the surface features through which the water pipeline will be installed. The number of tunnelled crossings was determined for each option including locations of launch and reception shafts to confirm total tunnelled lengths. The constructability of each option in terms of site access, flood risk and ground conditions was also considered. Three phase power supplies will be required at the water treatment works and the intermediate pumping station sites.

Planning	Like Options B and C, the key planning constraint affecting Option E is the North Wessex Downs AONB. Whilst Option E has a shorter main pipeline length within the AONB, it requires spur pipeline within the AONB, together with intake, screen and pumping infrastructure at a sensitive location on the River Thames between Reading and Pangbourne. In addition, the main water treatment works infrastructure would be located outside but adjoining the AONB boundary near Theale. Planning policy requires the Secretary of State to "*refuse development consent in these areas except in exceptional circumstances and where it can be demonstrated that the development is in the public interest*". On the basis of the information currently available it is considered that exceptional circumstances are likely to be capable of being demonstrated for the pipeline (including the buried nature of the pipeline and predominately temporary nature of construction impacts), however the case for the intake etc infrastructure on the banks of the River Thames between Reading and Pangbourne is more complex, given there is an alternative (Options B and C) which do not require such infrastructure within the AONB. More detailed environmental, engineering and social, planning and land assessments will be undertaken before and beyond Gate 2. Beyond Gate 2 these could appropriately focus on routeing within the shortlisted corridor through the AONB, and further details of the scale and impacts of necessary above ground infrastructure within and adjoining it at Pangbourne and Theale, if Option E is a preferred option. There are a number of other environmental constraints and designations that could be directly or indirectly impacted by Option E, which planning policies would seek to protect from harm. These include crossings of an SSSI, main rivers, and Option E's corridor including or lying adjacent to designated sites. As part of the more detailed assessments to be undertaken before and after Gate 2, it is considered likely that appropriate engineering design and environmental mitigation could be devised and would be capable of being adopted to minimise impacts to a level acceptable in terms of planning policy. Option E has a housing allocation within the corridor at Theale, for which a detailed residential layout is not yet available. There is the potential for the pipeline to route through or trenchless beneath any landscaping or roads in the site, subject to detailed design of the scheme. Alternatively, the corridor may need to re-route further west, although this would re-enter the AONB and a registered park and garden. Option E seeks to avoid most of the areas on the periphery of larger settlements such as Basingstoke, where development pressure, principally for residential development, has the potential to further constrain the shortlisted corridor. However, there are some locations on the periphery of Andover, and to a more limited extent on the northern periphery of Winchester, where the corridor contains land included within local authority Strategic Housing and Employment Land Availability Assessments (SHELAA). Future development proposals will need to be kept under review. The overall planning conclusion is that on the basis of the available information, a T2ST scheme based on Option E has risks relating to its future consentability, particularly with the above ground infrastructure on the banks of the River Thames within the AONB between Reading and Pangbourne.

Land	Given the time scales for the delivery of the project, detailed land investigations such as land referencing is not being undertaken for T2ST at this stage. A limited desk based review of public information sources on land ownership and categorisation has been undertaken, from which the following conclusions can be reached. Option E avoids National Trust and MoD land. There is common land in Hampshire which the corridor includes. Rural parts of Berkshire and Hampshire include equestrian businesses and large rural estates and the corridor intersects a number of these. The corridor for Option E includes some land on the periphery of larger settlements where land values associated with future residential development could be high. On the basis of the above, whilst there are land issues to be explored further beyond Gate 2, including the acquisition of land for permanent above ground infrastructure at Pangbourne and elsewhere, the land issues are not considered to be more complex than would be expected for a scheme of this scale.

6.2.8 From the above, if the option is taken forward as a preferred option then further work beyond Gate 2 on Option E could include:

- Finer grain location and siting of River Thames abstraction infrastructure, screens and pumping station to minimise impact on designated sites, including the North Wessex Downs AONB;
- Finer grain location and siting for water treatment works at Theale, and risks and mitigation for INNS risk between River Thames and River Kennet:
- Further assessment of the impacts of abstraction from the River Thames, licence interaction with the Lower Thames Operating agreement, impacts on allowable releases to the Thames from SESRO / STT and consequential abstractions downstream, and river leakage losses during drought conditions;
- More detailed assessments to inform routeing of the transfer pipeline to minimise impact on designated sites including the North Wessex Downs AONB;
- Targeted land referencing to inform land acquisition risks of above ground infrastructure sites;
- Engagement with local planning authorities to continue assessment of the potential for future housing development to constrain identified pipeline routes and above ground infrastructure sites, requiring back-checking and consideration of route and site amendments;

6.3 Identification of the Preferred Options

6.3.1 Taking the outcomes from the assessments described above, a comparison of the shortlisted options can be made, informing the selection of the preferred option.

Summary of the key issues assessed for the three shortlisted options

Environment & Social summary on Options B, C and E

6.3.2 Option B and C are similar in their location, which results in their impacts on receptors also being similar, with the key differences between them being the following:

- Option B affects Cliffeville authorised landfill and an additional scheduled monument, which is not affected by Option C;
- Option C affects Bere Mills SSSI, which is not affected by Option B, and is in close proximity (within 15m) to a greater number of Ancient Woodlands than Option B.

6.3.3 Option E affects fewer designated sites to Options B and C, but is located in close proximity (within 15m) to a greater number of Ancient Woodlands than Option B and C. Option E has significant abstraction infrastructure within the AONB on the bank of the River Thames, but much less of its length located within the AONB than Options B and C.

Engineering summary on Options B, C and E

6.3.4 Option B and C have large common sections of pipeline corridor and are broadly similar in form, with the key differences between them being the following:

- Option B has a marginally longer pipeline length and one more pumping station than Option C;
- Option C involves two additional crossings of the A34 and one additional River Test SSSI crossing for the main pipeline and one additional spur pipeline A34 crossing, with consequential additional engineering risks and complexities.

6.3.5 Option E has an overall longer pipeline length than options B and C (99km versus approx. 93km). It also has abstraction licensing complexities and water quality risks that Options B and C do not have, alongside engineering challenges in designing and locating necessary abstraction and water treatment infrastructure within planning and environmental constraints. Option E also connects to Kingsclere WSR and not Beacon Hill WSR. Beacon Hill WSR has a higher water level than Kingsclere WSR and is hence of greater strategic importance supplying a higher number of Southern Water customers than Kingsclere WSR.

Planning and land summary on Options B, C and E

6.3.6 The overall planning conclusion is that on the basis of the available information, a T2ST scheme based on Option B or C is likely to be consentable, whereas a T2ST scheme based on Option E has risks relating to its future consentability, particularly with the above ground infrastructure on the banks of the river Thames within the AONB between Reading and Pangbourne.

6.3.7 Whilst there are land issues to be explored further beyond Gate 2, including the acquisition of land for permanent above ground infrastructure, the land issues are not considered to be more complex than would be expected for a scheme of this scale. Risks are considered to be higher for Option E than for Option B and C.

Preferred option identification

6.3.8 As a result of the detailed assessments undertaken and workshop consideration of the options, Options B and C were determined to be Preferred Options. Option E was held back at this stage, based on the key factors and risks associated with that option.

6.3.9 Options B and C have a similar range of constraints and risks associated with them at this stage, with opportunities to mitigate risks through further, more detailed assessments and design evolution. Based on the work undertaken to this stage, Option E has a materially higher range of constraints and risks associated with it, such that there is a clear distinction between it and the other Options, leading to the conclusion that it should be held back.

6.3.10 The preferred option decisions are therefore:

Option	**Shortlist decision**
B	**Shortlisted as a Preferred Option**
C	**Shortlisted as a Preferred Option**
E	Hold back

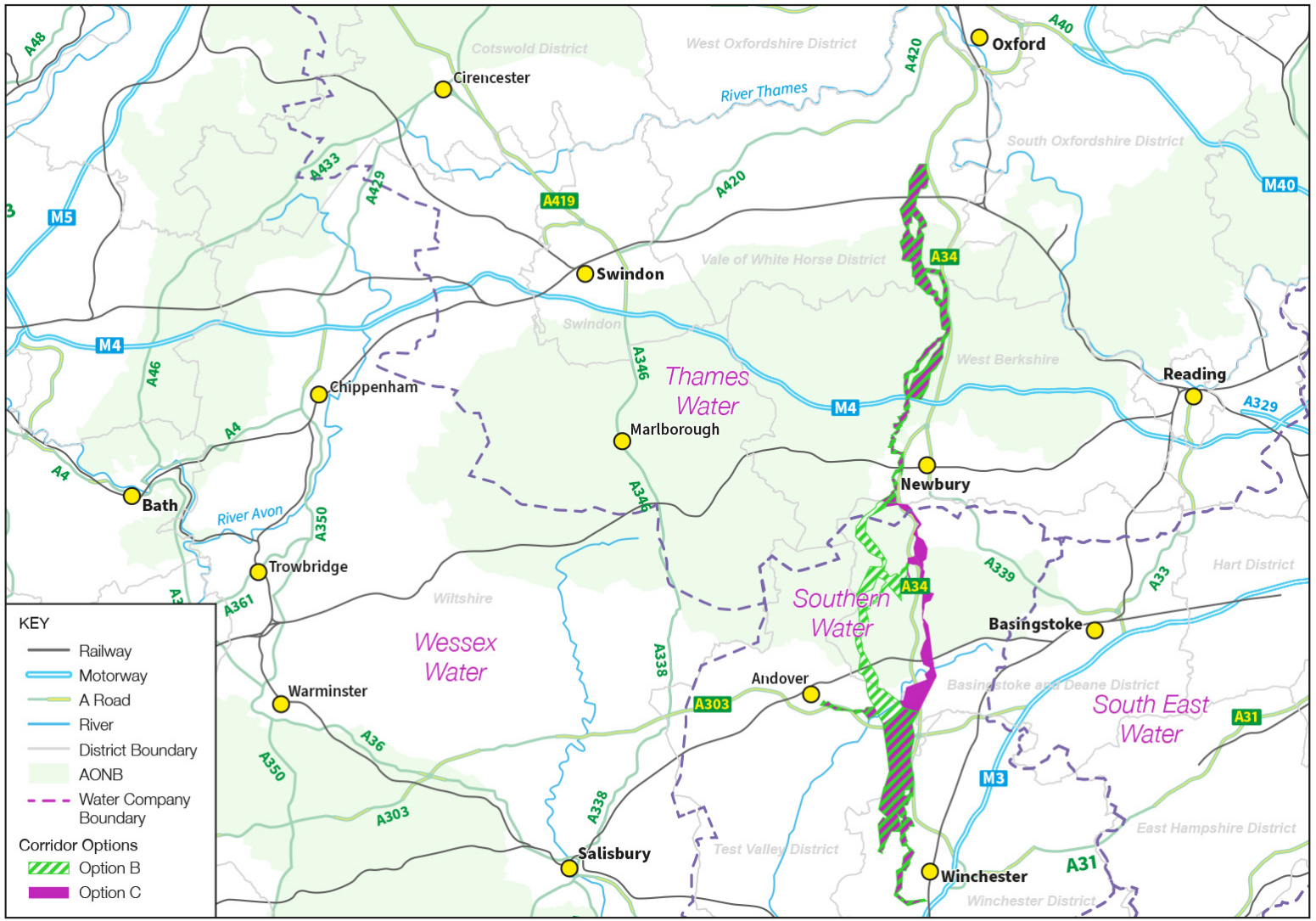
6.3.11 Options B and C are therefore identified as the Preferred Option(s) for the purposes of the Gate 2 submission.

6.3.12 A plan identifying the two options is included in Figure 6.1 below.

6.4 Stage 8 – Route and Site Selection Report

6.4.1 This report is Stage 8 – providing the outcomes from the multi-stage route and site selection process in this Route and Site Selection Report, for submission as Annex A2 at Gate 2.

Figure 6.1 - Plan of the Gate 2 Preferred Options B and C



7. Next steps

7.1 Gate 2 work

7.1.1 The Preferred Options – Option B and Option C will be taken forward for incorporation into engineering, environmental and planning assessments for the RAPID Gate 2 submission in November 2022.

7.2 The Gate 2 submission

7.2.1 The Gate 2 submission includes more detailed information on the preferred options in the following Gate 2 submission documents:

- Concept Design Report (Gate 2 Report Annex A3)
- Planning and Consent Strategy Report (Gate 2 Report Annex G)
- Environmental Assessment Report, Habitats Regulatory Assessment Report, and Strategic Environmental Assessment Report (Gate 2 Report Annexes B1, B2 and B4 respectively).

7.3 Beyond Gate 2

7.3.1 Beyond Gate 2, further assessments will be undertaken on specific locations and parts of the preferred options, particularly where there are potential environmental or engineering pinch points or challenges, together with potential locations for above ground infrastructure. Additional work on the land strategy for the options will also be undertaken, alongside further engagement with the local planning authorities and other key stakeholders. A back-checking process will be undertaken following further assessment work beyond Gate 2, to review whether there is a need for any re-assessment of decisions previously taken to hold back other options.

7.3.2 The timing and level of detail for the additional work will be driven by the timing of the delivery of T2ST as set out in the Water Resources in the South East draft regional plan and draft Water Resource Management Plans.

7.3.3 It is intended that the route and site selection work will also assist and inform consideration of alternatives in the context of future applications for consent, appropriately updated and with stakeholder engagement.

Appendix 1 – Stage 2a criteria for the preliminary assessment of corridors

Criteria Name	Indicative Values			Derived from
	Red	Amber	Green	
Engineering				
Route Section – features (including crossings and trenchless requirements)	Features have potential to prohibit development.	Will require compromise/ mitigation in order to be workable	No or limited constraints.	N/A
Route Section means of access	Significant difficulties achieving access	Access can be achieved but compromise/ mitigation required	Good access	N/A
Environment and Social				
Biodiversity, Flora and Fauna – designated sites	Within an International / National designated site	Within 100m of an International / National designated site	No or positive impact	dNPS W-R Table 4 / paragraphs 4.3.8 – 4.3.11 NPPF paragraphs 180 – 182
Biodiversity, Flora and Fauna – Ancient Woodland	Within 15m of an area of mapped Ancient Woodland	Within 100m of an area of mapped Ancient Woodland	No or positive impact	dNPS W-R Table 4 / paragraph 4.3.14 NPPF paragraph 180
Soils – agricultural land	Includes Grade 1 agricultural land	Includes Grade 2 or Grade 3 agricultural land (No Grade 1)	Includes Grade 4, or 5 agricultural land (No Grade 1, 2 or 3)	dNPS W-R Table 10 / paragraphs 4.10.12 and 4.10.18
Soils – landfill sites	Includes an authorised landfill site	Within 500m of an authorised landfill site and/or includes a historic landfill site	Over 500m from an authorised landfill site and/or within 500m of a historic landfill site	dNPS W-R Table 10 / paragraph 4.10.5 NPPF paragraph 188
Water - Flood Zone	Includes Flood Zone 3	Includes Flood Zone 2	Includes Flood Zone 1	dNPS W-R Table 8 / paragraphs 4.8.10 – 4.8.15 NPPF paragraph 167
Landscape	Within a National Park or AONB	Within 100m of a National Park or AONB	No or positive Impact	dNPS W-R – Table 9 / paragraph.4.9.9 – 4.9.11 NPPF – paragraphs 176 – 178
Historic environment	Includes a heritage designation (Listed buildings, Registered Parks and Gardens, Registered Battlefields, Scheduled Monuments, World Heritage Sites)	Within 100m of a heritage designation	No or positive Impact	dNPS W-R Table 7 / paragraphs 4.7.11 – 4.7.25 NPPF paragraphs 199 - 208

Environment and Social (continued)				
Residential property - Construction impacts	Pipeline route predominantly through built up areas.	Pipeline route partly through built up areas	Pipeline route largely not through built up areas.	
Planning				
Existing or designated use of site	Existing/designated land use within corridor section likely to preclude development	Existing/ designated use not ideal but mitigation measures would ensure acceptability	Existing/ designated use does not-conflict with use of site	Adopted Development Plan
Emerging potential designated use, or evidence of land being promoted for development	Potential designated use or land promotion indicates high risk that development for alternative uses likely to preclude development	Potential designated use or land promotion indicates low risk that development for alternative uses likely to preclude development	No known emerging designations or land promotion	Emerging Development Plan
Mineral extraction	Route section intersects with an allocated minerals site	Intersects with a safeguarded site or zone	No minerals site or safeguarding zone	dNPS W-R paragraph 4.10.14 NPPF paragraphs
Green belt	Within the green belt	Adjacent to and affecting the setting of green belt	No or positive impact	dNPS W-R paragraphs 4.10.11 and 4.10.19 NPPF paragraphs
Neighbouring land uses	Nature of surrounding land use likely to preclude development	Nature of surrounding land use not ideal, but mitigation measures would ensure acceptability	No or positive impact	N/A
Property				
Special Category Land, **Defence Estates**, and Crown Land	Land comprises special land for the purposes of the Acquisition of Land Act 1981 or Crown Land	Land includes some special land for the purposes of the Acquisition of Land Act 1981 or Crown Land	Land does not include any 'special land' for the purposes of the Acquisition of Land Act 1981 or Crown Land	Planning Act 2008 CROW Act 2000
Acquisition Costs	Acquisition costs likely to be relatively high	Acquisition costs likely to be moderate	Acquisition costs likely to be relatively low	N/A

Appendix 2 – Stage 4a criteria for the preliminary assessment of sites

Criteria Name	Indicative Values			Derived from
	Red	Amber	Green	
Engineering				
Site features	Site features have potential to prohibit development of site.	Will require compromise/ mitigation in order to be workable	No or limited constraints.	N/A
Site location	Site is adjoined by other land uses or features making engineering / construction difficult to achieve	Site is adjoined by other land uses or features but engineering / construction can be achieved with mitigation	Site is not adjoined by other land uses or features that would impede making engineering / construction	N/A
Site means of access	Significant difficulties achieving access	Good access can be achieved but compromise/ mitigation required	Good access	N/A
Environment and Social				
Biodiversity, Flora and Fauna – designated sites	Within an International / National designated site	Within 100m of an International / National designated site	No or positive impact	dNPS W-R Table 4 / paragraphs 4.3.8 – 4.3.11 NPPF paragraphs 180 – 182
Biodiversity, Flora and Fauna – Ancient Woodland	Within 15m of an area of mapped Ancient Woodland	Within 100m of an area of mapped Ancient Woodland	No or positive impact	dNPS W-R Table 4 / paragraph 4.3.14 NPPF paragraph 180
Soils – agricultural land	Includes Grade 1 agricultural land	Includes Grade 2 or Grade 3 agricultural land (No Grade 1)	Includes Grade 4, or 5 agricultural land (No Grade 1, 2 or 3)	dNPS W-R Table 10 / paragraphs 4.10.12 and 4.10.18
Soils – landfill sites	Includes an authorised landfill site	Within 500m of an authorised landfill site and/or includes a historic landfill site	Over 500m from an authorised landfill site and/or within 500m of a historic landfill site	dNPS W-R Table 10 / paragraph 4.10.5 NPPF paragraph 188
Water - Flood Zone	Includes Flood Zone 3	Includes Flood Zone 2	Includes Flood Zone 1	dNPS W-R Table 8 / paragraphs 4.8.10 – 4.8.15 NPPF paragraph 167

Environment and Social (continued)				
Landscape	Within a National Park or AONB	Within 100m of a National Park or AONB	No or positive Impact	dNPS W-R – Table 9 / paragraph.4.9.9 – 4.9.11 NPPF – paragraphs 176 - 178
Historic environment	Includes a heritage designation (Listed buildings, Registered Parks and Gardens, Registered Battlefields, Scheduled Monuments, World Heritage Sites)	Within 100m of a heritage designation	No or positive Impact	dNPS W-R Table 7 / paragraphs 4.7.11 – 4.7.25 NPPF paragraphs 199 - 208
Population and human health – Property and community assets	Includes property and community assets (buildings, schools, medical facilities, allotments, bowling green, cemetery, golf course, sports facility, play space, playing field, public park or garden, religious grounds, tennis courts)	Within 100m of property and community assets	No or positive Impact	dNPS W-R paragraph 4.10.16, Table 12 / paragraph 4.13.10-4.13.11 NPPF paragraphs 92-95
Planning				
Existing or designated use of site	Existing/designated use of site likely to preclude development	Existing/ designated use of site not ideal but mitigation measures would ensure acceptability	Existing/ designated use of site does not conflict with use of site	Adopted Development Plan
Emerging potential designated use, or evidence of land being promoted for development	Potential designated use or land promotion indicates high risk that development of site for alternative uses likely to preclude development	Potential designated use or land promotion indicates low risk that development of site for alternative uses likely to preclude development	No known emerging designations or land promotion	Emerging Development Plan
Mineral extraction	Within an allocated minerals site	Within a safeguarded site or zone	Not within a minerals site or safeguarding zone	dNPS W-R paragraph 4.10.14 NPPF paragraphs
Green belt	Within the green belt	Adjacent to and affecting the setting of green belt	No or positive impact	dNPS W-R paragraphs 4.10.11 and 4.10.19 NPPF paragraphs
Neighbouring land uses	Nature of surrounding land use likely to	Nature of surrounding land use not ideal, but	No or positive impact	N/A

	preclude development	mitigation measures would ensure acceptability		
Property				
Special Category Land, **Defence Estates**, and Crown Land	Land comprises special land for the purposes of the Acquisition of Land Act 1981 or Crown Land	Land includes some special land for the purposes of the Acquisition of Land Act 1981 or Crown Land	Land does not include any 'special land' for the purposes of the Acquisition of Land Act 1981 or Crown Land	Planning Act 2008 CROW Act 2000
Acquisition Costs	Acquisition costs likely to be relatively high	Acquisition costs likely to be moderate	Acquisition costs likely to be relatively low	N/A