

Hampshire Water Transfer & Water Recycling Project Scheme Development Report – 2 of 3 documents

VOLUME NUMBER: 5

PLANNING INSPECTORATE SCHEME NUMBER: WA010002

APPLICATION DOCUMENT REFERENCE: 5.10

APFP REGULATION: 5(2)(g)

May 2026

Version 0



from
**Southern
Water** 

The Southern Water logo consists of three stylized, wavy blue lines of varying lengths, positioned to the right of the word 'Water'.

Hampshire Water Transfer and Water Recycling Project
Scheme Development Report

Appendix A Site and Route Selection Level 4 Criteria

A.1.1 The criteria that were used to shortlist sites within the site and route selection at Stage 2 are as set out below. The site selection considered the proximity to or interface with these areas.

- Nationally Significant Infrastructure Projects, Town and Country Planning Act developments, and Transport and Works Act Order development.
- Areas at risk of flooding from rivers or the sea, as defined by the Environmental Agency's flood map for planning.
- Source protection zones.
- Existing rivers and drains.
- Schools, care homes, hospitals and care homes.
- Ease of access from major transport routes, e.g. road, rail and water.
- Ground conditions, considering the geology and soils of the land.
- Previous potentially contaminating land uses.
- Land listed on the brownfield register.
- Priority habitat inventory.
- Local nature reserves.
- National nature reserves.
- Ancient woodland.
- Sites of Special Scientific Interest.
- Ramsar sites.
- Special Areas of Conservation and candidate sites.
- Special Protection Areas and potential sites.
- Marine Conservation Zones.
- Water Framework Directive waterbodies, protected areas or habitats.
- Heritage coasts.
- Country Parks.
- Air Quality Management Areas.
- Areas of Outstanding Natural Beauty (now National Landscapes).
- National Parks.
- Greenbelt.
- Registered Parks and Gardens.
- Listed Buildings.

- Scheduled Monuments.
- Registered Battlefields.
- Important or recognised viewpoints.
- National trails.
- Public rights of way.
- Sites safeguarded in the Minerals and Waste Plan.
- Sites of Importance for Nature Conservation.
- Biodiversity Opportunity Areas.
- Agricultural land classification including Best and Most Versatile agricultural land.
- Conservation Areas.
- Tranquil areas mapped by a National Park Authority.
- Dark skies areas.
- Public open space identified in a local plan.
- Industrial or commercial allocations in a local plan.

Appendix B Review of the Stage 2 Options Appraisal Process Report

Gate 2 Options Appraisal Process Review Final Report

April 2026



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Glossary

AGP	Above Ground Plant
BAU	Business As Usual
BNG	Biodiversity Net Gain
BUO	Back Up Option
DEFRA	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
DEZLN	Department for Energy Security and Net Zero
DO	Deployable Output
DWI	Drinking Water Inspectorate
EA	Environment Agency
EBL	Environmental Buffer Lake
ENG	Environmental Net Gain
FNA	Future Needs Assessment
FNS	Future Needs Statement
HTR	Havant Thicket Reservoir
HWTWRP	Hampshire Water Transfer and Water Recycling Project
LPO	Legal and Policy Obligations
MI	Megalitres
MI/d	Megalitres per day
NSI	Net Social Impact
NPSWRI	National Policy Statement for Water Resources Infrastructure
Ofwat	The Water Services Regulation Authority
OAP	Option Appraisal Process
OEP	Option Evolution Plan
PW	Portsmouth Water
RAG	Red, Amber, Green
SME	Subject Matter Expert
SO	Selected Option
SRO	Strategic Resource Option
SWS	Southern Water Services Ltd
WfLH	Water for Life Hampshire
WRMP	Water Resource Management Plan
WRPG	Water Resource Planning Guideline
WRP	Water Recycling Plant

1 Executive Summary

Background

The Gate 2 Options Appraisal Process (Gate 2 OAP) determined the Selected Option (SO) for Southern Water Service (SWS)'s strategic resource option (SRO) for the Hampshire area. Over five years will have elapsed between the Gate 2 OAP and the examination and decision-making stages of the Development Consent Order (DCO) process, which are scheduled to take place in 2026/27. The design and development of the Hampshire Water Transfer and Water Recycling Project (HWTWRP) have progressed and there may have been changes in the wider legal, policy, and regulatory context that are material to the case for the scheme. In June 2025, SWS commissioned an Option Appraisal Process (OAP) review of the Gate 2 OAP to evaluate the impact on optioneering decisions of any such changes.

The Gate 2 OAP comprised a set of interdependent assessment processes, three of which generated the evidence base needed to define and appraise the options, namely:

- Site & route selection;
- Consenting risk evaluation;
- Best value assessment,¹ based on a Multi-Criteria Decision Analysis (MCDA).

The outputs of these assessments informed further assessments of the options, focusing on their:

- Compliance with Legal and Policy Obligations;
- Alignment with Strategic Objectives.

All of the above elements informed the overall business evaluation and decision process in the Gate 2 OAP.

Aims and approach

The aim of the OAP review was to determine whether the outcome of the Gate 2 OAP remains valid. The intention was not, however, to re-run the process in its entirety, but to follow a proportionate approach focusing on changes that could have a material impact on the optioneering. This included limiting consideration of options to those that could feasibly meet the current project requirements.

To ensure a robust yet proportionate approach, the OAP review was undertaken in two distinct phases:

- a **scoping phase**, the aim of which was to identify the feasible options to be assessed in the OAP review and the key changes that could have a material impact on their assessment;
- a **review and testing phase**, the aim of which was to reconsider the performance of the feasible options in terms of the various assessment processes, in light of the key changes identified at the scoping stage.

¹ The Water Resource Planning Guideline defines a best value plan as one that “considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society. [It] should be efficient and affordable to deliver, legally compliant and account for the range of legislation that applies to it.”

Scoping the OAP review

Project requirements

The current project requirements are for an SRO with capability to supply peak deployable output (DO) of up to 90 Ml/d and a requirement for drought resilience that resolves future regional needs in up to a 1 in 500-year drought event by 2039.²

A change in project requirements since the Gate 2 OAP arose from the Water Resources South East (WRSE) modelling that underpins SWS' emerging WRMP24. This showed that rather than acting as a 'resilience asset', operating primarily in drought years, the scheme would act as a BAU asset operating in normal as well as drought years. This change affects certain operational assumptions, with consequences for key impacts such as operational carbon.

In-scope options

The project requirements determined the scope of options that were considered in the OAP review. Only two feasible options were identified, namely:

- HWTWRP – the Selected Option (SO) that has been developed since Gate 2, when it was known as Evolved Option B.4; and
- The Back Up Option (BUO), known as Evolved Option B.5 at Gate 2.

It was confirmed that the basis for not taking forward desalination options beyond Gate 2 remain valid and therefore these options were not reconsidered as part of the OAP review. Similarly, the reasons the remaining recycling and transfer options considered at Gate 2 could not be evolved to meet the revised DO requirement remain valid and these options were also not reconsidered as part of the OAP review.

There has been only limited development work undertaken on the BUO since Gate 2. For the purposes of the OAP review it was therefore assumed that where there are shared design elements across the SO and BUO, and the latest assumptions for the SO (for example in respect of cost) would be applied to the BUO. For other elements of the BUO, the design assumptions made for Evolved Option B.5 at Gate 2 were generally used, unless specific new information was available.

Reassessment of options

Scoping approach

The assessment frameworks used in the Gate 2 OAP in relation to the consenting risks and MCDA involved numerous criteria, not all of which were necessarily pertinent to the OAP review. Rigorously scoping the reassessments required for these processes was key to a proportionate and robust OAP review and this was the main focus of this part of the scoping phase. In practice, it was not necessary to consider the remaining Gate 2 OAP assessment processes at this stage, as:

- The siting and route selection process had been updated continuously since Gate 2, and a further review would not produce a different outcome to current reporting. Instead, an overview of the ongoing review processes was provided – see Section 5;
- The assessments of compliance with Legal and Policy Obligations and alignment with Strategic Objectives, together with the overall business evaluation and decision making drew on the outcomes

² As required by the [Water Resources Planning Guideline](#) (WRPG2023), April 2023, which is the primary Defra guideline underpinning the development of SWS's emerging WRMP.

of the preceding assessment processes. Similarly, the OAP review reassessments relied on the outcomes of the consenting risk and MCDA reassessments.

Factors of potential relevance to the outcomes of the consenting risk and MCDA reassessment processes were identified through a structured Subject Matter Expert (SME) - led review process.

The following types of change were considered:

- Changes in contextual factors, including legal, policy and regulatory changes, updates in appraisal guidance, and so on;
- The changes in project requirements and feasible options – see above and Section 3;
- Factors that could affect the performance of the feasible options against the assessment criteria, such as changes in option design assumptions, information arising through the option development process, including changes in the local planning context, etc.

Consideration was given to the potential impacts of the above changes on various assessment factors, namely:

- the structure of the consenting risk and MCDA decision-making frameworks, i.e. to avoid bias in the overall balance of impacts considered;
- the specification of the assessment criteria, i.e. to avoid bias in the scoring of the feasible options; and
- the expected performance of the feasible options against individual criteria, i.e. to ensure selection of 'in-scope' criteria against which the feasible options were to be reassessed reflected the full range of likely changes affecting option performance.

Scoping outcomes

A decision-making workshop was held for senior SWS personnel and their advisors to approve the proposed scope of the reassessment to be carried out in the review and testing phase.

A wide range of contextual and option-specific changes were considered to have a potentially material impact on the consenting risk and MCDA assessments, though none of these were deemed to warrant fundamental structural changes to the assessment frameworks. A significant number of assessment criteria were deemed to be 'in-scope', as a result of combinations of potentially material changes in contextual factors and option-specific factors. For example, landscape impacts warranted reassessment owing to both updated duties to protect national parks and updated information on the expected impacts of the feasible options on South Downs National Park (SDNP). In other cases, the reassessment of criteria was warranted on the basis of technical changes to appraisal methods and parameters that indicated the specification / scoring methodology of key metrics may need updating, e.g. the valuation of carbon, BNG and natural capital services.

The review, which is reported in full in Table 6, identified 15 out of 25 consenting risk evaluation criteria and 18 out of 23 MCDA criteria as in-scope for review and testing.

Some of the changes in key contextual factors were considered *not* to be material, including:

- A change in the carbon objective, to reflect SWS's updated net zero policy. It was confirmed that the change has no material impact on the level of ambition demonstrated by the commitment across the life of the programme, which still aims to deliver whole life emissions that are as low as reasonably practicable;
- The *Finch*³ ruling on the treatment of downstream carbon, which the SWS carbon team confirmed had no material impact on the required scope of carbon impact assessment for the project.

³ R (Finch) v Surrey County Council & Others [2024] UKSC 20

Review of consenting risks

A qualitative SME-based assessment was carried out for the SO and BUO against the 15 in-scope consenting risk criteria by suitably qualified SMEs working on HWTWRP.

The SMEs were asked to consider the changes identified through the scoping exercise and whether the RAG ratings given to the SO and BUO in the Gate 2 OAP consenting evaluation should stay the same or be changed. Their provisionally updated RAG scores and explanations were then tested and validated in two workshop sessions, attended by the SMEs and a senior SWS working group.

In summary, the consenting risk review found that, as was the case in the Gate 2 OAP, the SO ranked more highly than the BUO, and in fact the gap in performance had increased, as shown in Table 1.

Table 1: RAG rating totals for SO and BUO, Gate 2 and OAP review

RAG ratings	SO		BUO		Change	
	Gate 2	OAP review	Gate 2	OAP review	SO	BUO
Large Adverse	3	2	4	6	-1	+2
Moderate Adverse	15	12	16	11	-3	-5
Minor Adverse	6	10	4	8	+4	+4
No impact	4	4	4	3	0	-1

There are 28 RAG ratings in total since for most of the 15 in-scope criteria there are separate RAG ratings for the construction and operational phases of the project. For a breakdown of RAG ratings by these phases, see Table 9. Commentary on key findings at the individual criteria level is provided in Section 6.4.

MCDA review

Updated inputs

Updated scores for the 18 sub-criteria in the MCDA framework were inputted for the SO and BUO. The updating process drew on existing workstreams where possible, though bespoke workstreams were also commissioned. These scores were then processed in a way that was consistent with the approach used in the Gate 2 OAP.

The ranking of the SO and BUO scores did not change for the majority of the sub-criteria. In some cases, the SO moved ahead of the BUO, but the BUO did not move ahead of the SO for any sub-criteria.

For embodied & operational carbon (E.08) and whole life cost (A.01), there were large absolute increases in monetised impacts for both the SO and BUO. Changes in project requirements and scheme design assumptions caused most of the change, with the remainder accounted for updated prices and values, as can be seen in Table 2.

Table 2: Gate 2 and OAP review scores for embodied and operational carbon and whole life costs

Criteria	Gate 2 scores (as reported)		Gate 2 scores (updated values)		OAP review scores (prices & values)	
	SO	BUO	SO	BUO	SO	BUO
E.08 Embodied and op. carbon	£15.5m	£26.7m	£26.4m	£41.7m	£109.0m	£153.9m
A.01 Whole life cost	£684m	£928m	£745m	£1,010m	£1,886m	£2,644m

Note: Carbon estimates and whole life costs are presented as present values over a 100-year appraisal period. These have been discounted using HMT Green Book social time preference rates.

The SO performed considerably better than the BUO at Gate 2 on both measures, and large differentials remained following the reassessment.

Other monetised impacts (climate regulation, natural hazard regulation, food production, recreation & amenity), were also updated for values and prices, but owing to a lack of information for the BUO it was not possible to update information on the key drivers. This also meant that the quantified assessment of BNG undertaken at Gate 2 could not be updated. Consideration was given to the potential impact of these limitations on the MCDA results through additional sensitivity testing – see below.

Aside from the updated monetary assessments, there were significant changes for only three of the remaining sub-criteria, namely:

- Flood risk, for which the ranking of the SO and BUO reversed, with the SO now outperforming the BUO;
- Historic environment (terrestrial) and Landscape & townscape, for which the SO and BUO had scored equally but the SO now ranks more highly.

The reasons for these changes are set out in Table 12.

Best Value Rankings (unweighted)

The reassessed scores for the SO and BUO across the 18 sub-criteria were brought together using the same 'Best Value Rankings' as in the Gate 2 MCDA, and the updated results were compared with the Gate 2 results. Key conclusions from the analysis of the *unweighted* rankings, i.e. with each sub-criterion given equal weight, are:

- The SO remains the more affordable solution, both when considering whole life cost alone and in combination with the likely cost of interim measures where an option cannot be delivered on time. The whole-life cost estimates increased significantly for both options, largely as a result of changed estimations of contractor costs, overheads and risks along with, in the case of the BUO, a major increase in the size of the EBL. The relative performance of the SO improved because the estimated cost increases were greater for it than for the BUO;
- The SO moves ahead of the BUO on overall Net Social Impact (environmental, social, customer impacts), though the changes are modest in magnitude compared to the shifts in cost and affordability;
- Both the SO and BUO deliver less Net Social Impact (NSI) per £ spent than at Gate 2, owing to the substantial increases in the estimated whole-life costs of both options. The SO nevertheless remains the more cost-effective option on this basis, with the margin between it and the BUO significantly increasing, owing to the combination of its improved relative performance in terms of both cost and NSI.
- When considering NSI relative to a broader affordability-based cost measure, the SO consistently ranked more highly than the BUO at Gate 2 and continues to do so.

While at Gate 2 the BUO performed marginally better than the SO in terms of NSI alone, the SO now consistently outperforms the BUO, i.e. affordability alone, NSI alone and various measures that combine NSI and affordability. The 'unweighted' findings therefore appear to confirm and strengthen the conclusion reached at Gate 2 that the SO performs better than the BUO in Best Value terms.

Best value rankings (weighted)

Overall rankings can nevertheless be sensitive to how clusters of sub-criteria are weighted when aggregating the results. To address this, 54 different scenarios using alternative weightings for NSI⁴ and affordability⁵ sub-criteria were tested. The number (and percentage) of scenarios in which the SO and the BUO perform better than one another, for each Best Value Ranking, both at Gate 2 and in the OAP review, is shown in Table 3.

Table 3: Outcomes of 54 tests: number (%) of tests in which SO and BUO rank more highly

Best value rankings		Gate 2		OAP review	
		SO	BUO	SO	BUO
1	Least cost	Not applicable – no weightings applied			
2	Affordability	4 (100%)	0	4 (100%)	0
3	NSI	2 (40%)	3 (60%)	5 (100%)	0
4	NSI per £100m of whole life cost	5 (100%)	0	5 (100%)	0
5a	Blended NSI and affordability: core weightings	20 (100%)	0	20 (100%)	0
5b	Blended NSI and affordability: focus group weightings	19 (95%)	1 (5%)	20 (100%)	0
Total		50 (93%)	4 (7%)	54 (100%)	0

At Gate 2, there were some combinations of NSI-only sub-criteria for which the BUO outperformed the SO, indicating potential scope for trading-off NSI and affordability. Nevertheless, once affordability was brought into the assessment, i.e. Best Value Rankings 4, 5a and 5b, the SO almost always performed better than the BUO, reflecting the greater margin between the options on affordability than on NSI.

Following the reassessment for the OAP review, the picture becomes simpler. The SO now ranks more highly than the BUO for all 54 combinations that were tested, i.e., the SO now outperforms the BUO not only on affordability, but also on NSI, across all the alternative weighting assumptions that were tested.

Sensitivity analysis

Additional sensitivity analysis was undertaken to replicate the approach taken at Gate 2, where appropriate, and to explore specific aspects of uncertainty in relation to challenges in updating some of the monetised impacts for the BUO.

Changes in cost and affordability

Sensitivity analysis of the Gate 2 results showed that for the SO and the BUO to switch positions under Best Value Ranking 1 (Least Cost), there would need to be a 35% increase in the whole life costs of the SO. Applying the same test, a 40% increase in the whole life costs of the SO is now needed to bring about such a switch in rankings. When common costs are excluded, i.e. those costs that would be the same or similar in both options, the increase in SO-only costs needed to switch the ranking is 242%.

At Gate 2, to switch the ranking of the SO and BUO in terms of NSI per £100m of whole life cost, the SO costs needed to increase by 17%. Applying the same test now requires a 57% increase in the whole life costs of the SO for the BUO to move ahead of it. This substantial change reflects the relative strengthening of the SO's position with respect to the BUO on both affordability and NSI.

⁴ Five alternative NSI weightings were tested using different combinations of weights for the environment, social, customer and deliverability clusters;

⁵ Four alternative Affordability weightings were tested, using different combinations of weights for whole life cost and cost of interim measures scores.

Input uncertainty

As discussed above, a number of quantified or monetised sub-criteria within the Environment and Society cluster could not be re-assessed for the BUO, owing to insufficient information about key drivers, i.e. largely, the scale of changes in land use of different habitat types. This issue affected:

- Biodiversity Net Gain (BNG);
- Natural hazard regulation;
- Climate regulation;
- Food production; and
- Recreation & amenity.

The Gate 2 assumptions were used in the reassessment for these five sub-criteria. In fact, the BUO outperformed the SO across these sub-criteria at Gate 2. Testing was therefore undertaken to establish how far the BUO's combined performance across them would need to further increase for it to move ahead of the SO in the overall NSI ranking. This showed the BUO would need to:

- Either decrease its impact on food production through a net reduction in arable land taken from ~16 ha to ~7ha, i.e. a ~57% reduction; or
- Increase reinstatement / offsetting of a mixture of climate regulating habitats from ~230 ha to ~600 ha, i.e. a ~156% increase.

The magnitude of the habitat changes needed to overturn the SO's lead in the overall NSI ranking indicates that the ranking is robust. Moreover, even if circumstances did 'tip the balance' in term of NSI, the SO would still perform substantially better on affordability and hence comfortably outperform the BUO in terms of overall best value.

Business evaluation and conclusion

The project's Legal and Policy Obligations and Strategic Objectives were reviewed by qualified experts. There were no substantive changes in the LPOs, with only formal changes required in references to the legal framework, to reflect the enactment of the Environment Act 2021 and designation of the NPSWRI in 2023. The Strategic Objectives were refined, again with necessary updates limited to formal changes in the Carbon and Adaptability objectives.

The options were assessed against the LPOs and Strategic Objectives. Across the LPOs, the SO's RAG position materially improved, while the BUO's either remained static or deteriorated. Similarly, the performance of the SO improved against the Strategic Objectives, while that of the BUO deteriorated.

These findings were brought together with the outputs of the prior stages of the OAP review, which in summary demonstrated:

- divergence in the consenting risk position, with the SO's performance improving and the BUO's deteriorating; and
- the MCDA results becoming more definitive, with the SO outperforming the BUO in every weighting scenario across all five Best Value lenses in the OAP review.

Senior evaluators then made a comparative assessment of the SO and BUO at workshops held on 2nd and 9th March 2026, in order to determine whether or not the SO represents the preferred solution for meeting the updated project requirements.

It was noted that the SO outperformed the BUO across all key evaluation dimensions, namely consenting risk, cost, carbon, resilience, deliverability, net social impact and alignment with Strategic Objectives. The SO is

more adaptable, offers greater regional resilience, and better supports the requirement to minimise reliance on Drought Orders and Permits.

On this basis, the senior SWS evaluators concluded, with high confidence, that the SO remains the Best Value solution.

This result was endorsed at a meeting of the Project Delivery Group on 7th April 2026.

2 Introduction

2.1. Background and context

Hampshire Water Transfer and Water Recycling Project

Ahead of its DCO application, SWS commissioned the OAP review of the Gate 2 OAP to review the options appraisal process for the HWTWRP, as submitted at Gate 2 of the RAPID process in December 2021.

OAP review

The Gate 2 OAP determined the SO for SWS's SRO for the Hampshire area. Over five years will have elapsed between the Gate 2 OAP and the examination and decision-making stages of the DCO process, which are scheduled to take place in 2026/27. The design and development of the HWTWRP have progressed and there may have been changes in the wider legal, policy, and regulatory context that are material to the case for the scheme.

A review of changes since the Gate 2 OAP and their potential impacts is needed to enable SWS to demonstrate that HWTWRP continues to represent the best value solution. This OAP review supplements the Gate 2 OAP and together they form the 'Full OAP', with the aim of considering whether the current scheme *continues* to represent the best value solution for addressing future need, as currently understood.

The aim of the review was to enable SWS to consider any material changes in any factors that could influence the results of the Gate 2 OAP, in advance of the DCO application being made to the Secretary of State. This will help ensure the decision making the OAP supports can withstand scrutiny through the DCO examination stage and any legal challenges.

Gate 2 OAP

The Gate 2 OAP comprised a set of interdependent assessment processes, three of which generated the evidence base needed to define and appraise the options, namely:

- Site & route selection;
- Consenting risk evaluation; and
- Best value assessment,⁶ based on a Multi-Criteria Decision Analysis (MCDA).

The outputs of these assessments informed further assessments of the options, focusing on their:

- Compliance with Legal and Policy Obligations; and
- Alignment with Strategic Objectives.

All of the above elements informed the overall business evaluation and decision process in the Gate 2 OAP. A fuller overview of the Gate 2 OAP is shown in Appendix 1.

⁶ The Water Resource Planning Guideline defines a best value plan as one that “*considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society. [It] should be efficient and affordable to deliver, legally compliant and account for the range of legislation that applies to it.*”

2.2. Overview of OAP approach

In principle, the entire Gate 2 OAP was within scope of the OAP review. The intention was not, however, to re-run the process in its entirety, but to follow a proportionate approach focusing on changes that could have a material impact on the optioneering. This included limiting consideration of options to those that could feasibly meet the current project requirements.

To ensure a robust yet proportionate approach, the OAP review was undertaken in two distinct phases, comprising a comprehensive scoping phase and a review and testing phase, as outlined below.

Scoping phase

The purpose of the scoping phase was to identify:

- Changes in project requirements and the range of feasible options to be assessed in the OAP review – see Section 3, and;
- The key changes since the Gate 2 OAP that could have a material impact on the assessment of the feasible options - see Section 4.

The assessment frameworks used in the Gate 2 OAP in relation to the consenting risks and MCDA involved numerous criteria, not all of which were necessarily pertinent to the OAP review. These two processes were therefore the main focus of the part of the scoping phase concerned with the assessment of the feasible options. In practice, it was not necessary to consider each of the assessment processes in the scoping phase:

- Ongoing updates of site and route selection factors were carried out for the SO following the Gate 2 OAP and a further review would not produce a different outcome to current reporting⁷. Instead, an overview of the ongoing review processes is provided (see Section 5);
- The review of compliance with Legal and Policy Obligations and alignment with Strategic Objectives, together with the overall business evaluation and decision making, needed to be undertaken in the light of the outcomes of the prior review and testing activities.

Review and testing phase

The purpose of the review and testing phase was to:

- Reconsider the performance of the feasible options in light of the key changes identified at the scoping stage, in relation to:
 - The consenting risks (see section 6), and
 - Best Value - MCDA (see section 7).
- Review the overall business evaluation and final decision making, to determine whether HWTWRP remains the Best Value option (see Section 8). This brought together the outcomes of the consenting risk and MCDA reassessments with reviews and updates of:

⁷ Similarly, an assessment of site and route factors for the BUO would not reveal new information: some SO and BUO assets would be the same, while the remaining assets, i.e. those that are unique to the BUO, would need developing, which is beyond the scope of the OAP review.

- The Legal and Policy Obligations and the extent to which the feasible options comply with them; and
- The Strategic Objectives and the extent to which the feasible options align with them.

3 Defining the feasible options

To ensure a proportionate approach to the OAP review, only options that can feasibly address the updated project requirements were considered in the OAP review.

The remainder of this section sets out:

- The evolution of the project requirements;
- The evolution of the options considered in the Gate 2 OAP;
- The consideration given to alternative options;
- A summary of out-of-scope options;
- The definition of the feasible options to be considered in the review and testing phase.

3.1. Evolution of project requirements

The project requirements define how the project meets its strategic and legal & policy objectives. These have evolved since SWS entered into its Section 20 Agreement with the Environment Agency in 2018, see Table 27 below.

The initial aim of the Gate 2 OAP was to select a Preferred Option for a 61 to 75 MI/d SRO, capable of meeting a residual Supply-Demand Balance deficit of 51 MI/d. The Gate 2 Interim Update (September 2021) reported that certain programme delivery risks had emerged, resulting in an increase in the residual Supply-Demand Balance deficit of 87 MI/d. In particular:

- A new bulk supply transfer from South West Water of 20 MI/d was no longer available;
- A new bulk supply from Portsmouth Water (PW) was expected to deliver 4 MI/d less DO; and
- Demand reduction measures were now expected to deliver 12 MI/d fewer water savings.

Gate 2 Future Needs Assessment

Following submission of the Interim Update, SWS undertook a Future Needs Assessment (FNA) to consider the implications of the above developments. This included a Future Needs Statement (FNS), which reassessed future need to a horizon of 2040. In addition to the above programme risks, it reflected an updated target for resolving regional future needs identified through the WRMP24 process, including a 1 in 500-year drought resilience requirement by 2039, replacing a 1 in 200-year requirement as required in WRMP19.

The FNS concluded that the evolved SROs should be capable of producing 90 MI/d of raw water to meet a future need of 87 MI/d.

Change in operating scenario

The development of WRMP24 also resulted in a change to the SRO operating scenario. The original requirement for the SRO was for a 'resilience asset', operating primarily in drought years, with minimal 'sweetening' flows in normal years. Modelling undertaken for WRMP24 showed that to address an increase in the forecast supply-demand deficit in non-drought years, HWTWRP will be required instead to operate as a BAU scheme in normal years as well as drought years.

3.2. Evolution of options considered in the Gate 2 OAP

The initial aim of the Gate 2 OAP was to select a Preferred Option for a 75 MI/d SRO. A shortlist of six options was considered, as shown in Table 4.

Table 4: Options considered at Gate 2 for a 75MI/d SRO

Option type	Option No.	Description
Desalination	A.1	75 MI/d DO desalination at Fawley direct to Testwood WSW.
	A.2	61 MI/d DO desalination at Fawley direct to Testwood WSW.
Water recycling	B.2	61 MI/d DO recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm WTW).
	B.5	75 MI/d DO recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW).
HTR transfers	D.2	61 MI/d DO – raw water transfer from HTR to Otterbourne WSW.
	B.4	15 MI/d DO recycled water (indirect) sent to HTR and 75MI/d transferred from HTR to Otterbourne WSW.

The desalination options (Options A.1 and A.2) were joint worst performing options in the Interim Evaluation, as reported in the Gate 2 Interim Update. Moreover, they were not progressed further as it was considered unlikely that they were consentable at that time, at the proposed location, based on the Consenting Evaluation. It was noted that a Habitats Regulations derogation case would likely need to be made for desalination options and that as better performing options were available, they would be unlikely to pass the ‘alternatives’ element of that test.

As discussed above, the Interim Update also reported a number of programme delivery risks that had emerged, with potential implications for project requirements. The Interim Evaluation considered the implications for option performance, reporting Option B.4 as the ‘most preferable’ option for meeting the higher DO requirement and Option B.5 as the ‘second most preferable’ option.

Following the Interim Update, Outline Option Evolution Plans (OEP) were prepared for the remaining options as part of the FNA, i.e. Options B.2, B.4, B.5 and D.2., to establish how they could evolve technically to meet the higher DO requirements, as confirmed in the FNS.

While all four options were capable of evolution to accommodate these requirements, the Outline OEPs for Options D.2 and B.2 concluded that in doing so, they would effectively lead to the same solutions as identified in the Outline OEPs for Options B.4 and B.5, respectively. Only two Outline OEPs were therefore progressed, namely those for Options B.4 and B.5.

The OEPs for Options B.4 and B.5 indicated that both options could meet the increased need through increasing the respective capacities of the transfer pipelines, pumping assets and Water Recycling Plant (WRP). In the case of Option B.5, the volume of the Environmental Buffer Lake (EBL) would also need to increase.

Following an option appraisal revalidation, as reported in the Gate 2 OAP Final Evaluation, ‘Evolved Option B.4’ was identified as the SO and ‘Evolved Option B.5’ as the BUO,⁸ confirming the provisional ranking reported at the Interim Evaluation Stage.

⁸ This confirmed the ranking in the Interim Evaluation, as reported in the Interim Update, namely, Option B.4 ranked first and Option B.5 ranked second.

3.3. Alternative options

Strategic options for addressing the regional supply-demand deficit were considered again following the Gate 2 OAP, within SWS's statutory water resources management planning process, WRMP24⁹. A wide range of options were considered, in line with the Environment Agency's (EA) updated guidance¹⁰. No further feasible options beyond the SO and BUO were identified through this process (although as discussed in the 'Project Requirements' above, modelling undertaken for WRMP24 showed that a change in the operating scenario was needed in order for HWTWRP to address an increase in the forecast supply-demand deficit in non-drought years). This included various alternative concepts that were proposed by third parties through the WRMP24 process, which SWS considered and formally responded to through the WRMP process. None of these options were assessed as capable of meeting the project requirements and deliverable within the required timeframe, and so they were not progressed further within the WRMP24 process.

Further work was undertaken as part of the OAP review to provide assurance that any options that were not considered feasible at earlier stages of scheme development but might now be, owing to changes in circumstances, were not excluded. In particular, a high-level technical review of potential changes affecting alternative SRO technologies was undertaken, focusing on desalination. This concluded that there had been no changes in technology, or contextual or project-specific factors, that could support a change in the conclusion that desalination options are unconsentable at the current time, in this location. Further details are set out in Appendix 2A.

3.4. Summary of out-of-scope options

The following options were not considered to be feasible and were therefore treated as out-of-scope:

- Those that were assessed at Gate 1 but not taken forward to the Gate 2 OAP;¹¹
- Those that were assessed in the Gate 2 interim evaluation but not taken forward beyond the Gate 2 Interim Update or the FNA;¹² and
- Those that were considered through the WRMP24 but not progressed.

In conclusion, no further options beyond the SO and BUO were identified as potentially 'in-scope'. The remainder of this section describes how these options were developed following the Gate 2 OAP, and key assumptions that are made about them for the purposes of the OAP review.

3.5. Defining the feasible options

Selected Option

Following Gate 2, detailed design and development work on the SO was undertaken, with the project, now known as HWTWRP, progressing through Gate 3 of the RAPID process. This included work to identify land where the pipeline would be located, sites for the Above Ground Plant (AGP), construction working areas to construct all components of the project, and environmental mitigation areas.

⁹ covering the five-year regulatory cycle from April 1st 2025 to 31st March 2030;

¹⁰ Water Resource Planning Guideline (WRPG), 2023;

¹¹ For further details, see Annex 5 of the Gate 2 Options Appraisal Report.

¹² See discussion in previous sub-section.

Back Up Option

Further feasibility work was undertaken on the BUO following Gate 2, culminating in a technical appraisal published in June 2022¹³ that identified several issues requiring resolution. It was found that the estimated capex was ~20% higher than the SO, and estimated opex and carbon impacts were also higher. The BUO would also have a longer delivery schedule and provide a less flexible solution than the SO. While technically feasible, the BUO would present a significantly more complex delivery challenge than the SO.

The Gate 3 Interim Update (May 2023) reported that work to develop items unique to the BUO had been paused. This decision was based on the risk to the delivery of the HWTWRP having decreased significantly following funding approval for HTR and a construction contract being awarded.¹⁴

As part of the OAP review scoping activities, SWS explored whether a better-performing BUO could be identified to address the issues reported in the June 2022 technical appraisal. It was concluded that no superior alternative to Evolved B.5 is currently available, and that no conceptual solution could be identified that outperformed HWTWRP. On this basis, it was agreed by SWS that, for the purposes of the OAP review, Evolved Option B.5 should be the comparator against which the performance of HWTWRP is considered.

Further details of the development and technical appraisal work undertaken in relation to the BUO following the Gate 2 OAP are provided in Appendix 2B.

Schematic diagrams showing key features of the SO and BUO are shown in Figure 1.

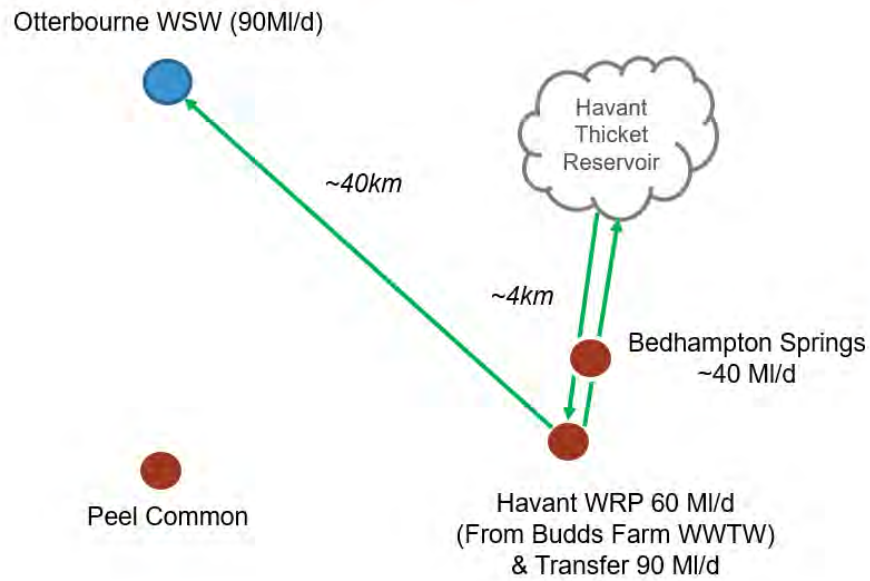
A summary of the options considered at key stages in the full options appraisal process, i.e. the Gate 2 OAP and the OAP review is shown in Figure 2.

¹³ "Option B.5 Evolution Review Report_1.0," June 2022.

¹⁴ The fundamental difference between the SO and BUO is the storage solution, with HWTWRP building on the strategic value of HTR, and the BUO dependent on the creation of a new EBL.

HWTWRP

Water recycling, reservoir recharging and transfer



Evolved Option B5

Water recycling and transfer

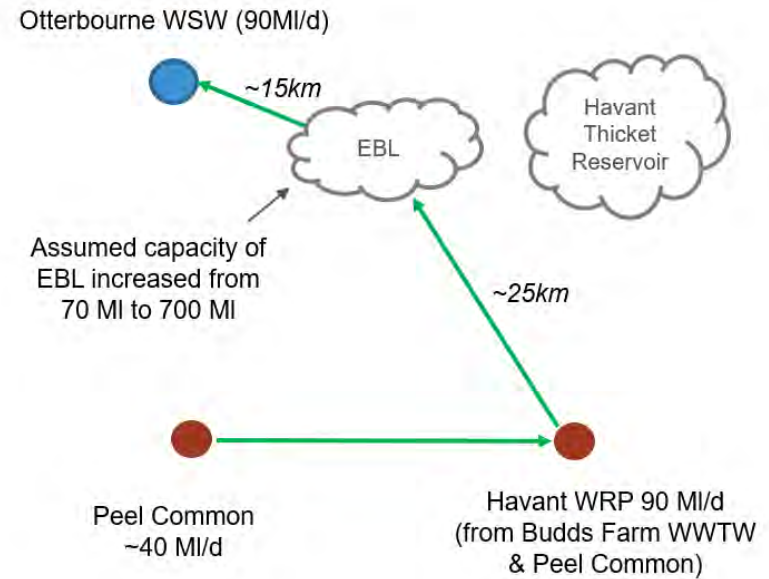


Figure 1: Key features of the SO (HWTWRP) and BUO (Evolved Option B.5)

	Gate 2 OAP (Interim Evaluation)			Gate 2 OAP (Full Evaluation)			Backcheck	
	Option	Description		Option	Description		Option	Description
Desalination	A.1	75 MI/d DO desalination at Fawley direct to Testwood WSW (Base Case)	✗		Not carried forward			Not carried forward
	A.2	61 MI/d DO desalination at Fawley direct to Testwood WSW	✗		Not carried forward			Not carried forward
Water recycling	B.2	61 MI/d DO recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm WTW)	➡		Capacity of the transfer pipeline and associated pumping assets between HTR and Otterbourne WSW increased from 75 MI/d to achieve 90 MI/d requirement.	➡	Evolved B.5	It is assumed that the transfer pipeline between the WRP site and Otterbourne WSW is the same as Option B.4 – see below. Assumptions about the pipeline from Peel Common WTW to the Havant WRP site and the capacity of the Havant WRP remain the same as in the Gate 2 OAP (Full evaluation). To meet a higher standard of resilience, the capacity of the EBL is assumed to increase from 70MI to 700 ML (10 days' storage capacity). Capacity of the Havant Water Recycling Plant (WRP) increased to 60 MI/day;
	B.5	75 MI/d DO recycled water (indirect) sent to an Environmental Buffer Lake (EBL) EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW)	➡	Evolved B.5	Capacity of the Havant WRP increased from 75 MI/d to 95 MI/d. Increasing the volume of the EBL from 75MI to 95 MI, to maintain a minimum 24-hours of buffering.			
Havant Thicket Reservoir transfers	D.2	61 MI/d DO – raw water transfer from HTR to Otterbourne WSW	➡		Capacity of the transfer pipeline and associated pumping assets between HTR and Otterbourne WSW increased from 75 MI/d to achieve 90 MI/d requirement.	➡	HWTWRP	The transfer capacity from HTR to Otterbourne Water Supply Works (WSW) remains at 90 MI/d. The option was progressed to identify land where the pipeline would be located, sites for the Above Ground Plant (AGP), construction working areas to construct all components of the project, and environmental mitigation areas.
	B.4	75 MI/day DO - 75MI/d raw water transferred from HTR to Otterbourne WSW for treatment. 15 MI/d DO recycled water (indirect) sent from WRP to Havant Thicket Reservoir (HTR).	➡	Evolved B.4	Capacity of the Havant WRP increased from 15 MI/d to c. 20 MI/d.			

Figure 2: Summary of options considered at key stages in the options appraisal process (Gate 2 OAP and the OAP review)

4 Scoping the Consenting Risk and MCDA Reassessments

4.1. Overview of Approach

Background

The assessment frameworks used to inform the consenting risk and MCDA evaluations in the Gate 2 OAP reflected a wide range of contextual factors, the range of option types under consideration and specific project requirements and objectives, all of which had changed since the Gate 2 OAP. In addition, considerable development work on the SO had taken place, resulting in changes in scheme design assumptions and information available to inform option performance. In light of these developments, it was deemed that a comprehensive scoping exercise was needed to update the consenting risk and MCDA assessment frameworks.

Contextual and option-specific factors

The key drivers considered in the scoping exercise, alongside the changes in project requirements and range of feasible options (see Section 3), were changes in:

- **Contextual factors**, including legal, policy and regulatory changes, updates in appraisal guidance, and so on. These provide the wider context within which the Gate 2 OAP and the OAP review assessments are conducted. Although not directly assessed or scored, they shape the selection, specification and scoring of the assessment criteria;
- **Option-specific factors** - factors that could affect the performance of the feasible options against the assessment factors, such as changes in option design assumptions, information arising through the option development process, including changes in the local planning context, etc.

Assessment factors

The materiality of the changes in contextual factors and option-specific factors was considered in terms of their potential impact on the relevant assessment factors, i.e., the measurable, evidence-based criteria selected and specified to provide robust and balanced consenting risk and MCDA evaluations of the feasible options. The following types of potential changes in assessment factors were considered:

- The structure of the consenting risk and MCDA decision-making frameworks, i.e. to avoid bias in the overall balance of impacts considered;
- The specification of the assessment criteria, i.e. to avoid bias in the scoring of the feasible options; and
- The relative performance of the feasible options against individual criteria, i.e. to select 'in-scope' sub-criteria requiring reassessment.

The overall scoping approach is illustrated in Figure 3.

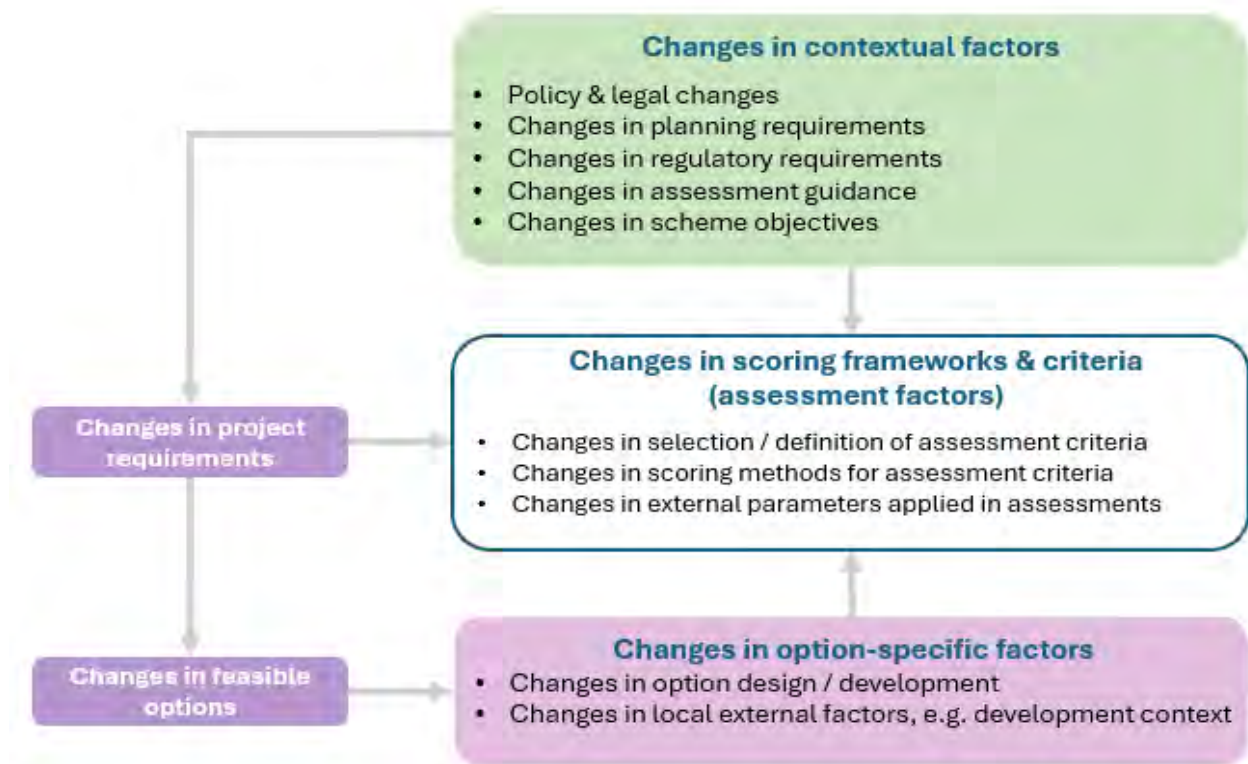


Figure 3: Overview of the scoping approach

4.2. The scoping process

Initial review of contextual factors

An initial, desktop-based review was undertaken to identify key where changes in the contextual factors could warrant changes in the consenting risk and MCDA assessment frameworks. This considered policy, legal and regulatory changes, including the overarching frameworks that influence the definition of best value and the various criteria against which the options were appraised.

The initial review identified over 50 distinct policy statements, guidance documents, and legislative instruments of potential relevance. These were grouped into five broad categories:

- **Planning and consenting:** national, regional, and local planning policies, as well as statutory consenting frameworks that govern the development and delivery of major infrastructure projects;
- **Legal:** primary and secondary legislation, case law, and statutory duties that define the legal obligations of SWS;
- **Environmental assessment and regulation:** the legislative and regulatory frameworks governing environmental protection, assessment, and permitting. It covers requirements under the Environmental Impact Assessment (EIA) Regulations, Habitats Regulations, and other statutory instruments that influence how environmental effects are identified, mitigated, and managed;
- **Water resources planning and management:** policies, plans, and regulatory requirements specific to the management of water resources. It encompasses water company statutory duties, regional and

national water resource plans, and regulatory expectations set by bodies such as the Environment Agency and Ofwat, including the EA's National Framework and the Water Resource Planning Guideline (WRPG); and

- **Appraisal and evaluation:** government guidance and methodologies for the appraisal of infrastructure schemes, such as HM Treasury's Green Book, Defra's appraisal frameworks, and MCDA guidance.

Such changes could include previously cited contextual factors – or the emergence of new legislation or case law, policy, or guidance within the five categories outlined above. Such changes could have various implications for the assessment frameworks, including, but not limited to:

- Changes in the methodologies used during the appraisal process. For example, if updated government guidance now requires a different approach to calculating carbon emissions, the methodology used in the original OAP may no longer align with current best practice;
- Revisions to the assessment factors or criteria. For example, new case law extending the scope of carbon assessments might require the inclusion of new criteria or a redefinition of existing ones; and
- Shifts in the weighting or emphasis placed on specific considerations during decision-making. For example, if flood risk has become a more prominent concern in national policy, it may now carry greater weight in the appraisal than it did previously.

SME-led scoping framework

Further consideration of contextual factors along with option-specific factors was undertaken through a collaborative Subject Matter Experts (SME) - led process, with SMEs selected on the basis of their experience of relevant option appraisal themes.

The process aimed to capture potential changes in contextual and option-specific changes that could materially affect either how the optioneering would be conducted today or its findings.

To ensure this process was undertaken on a structured and transparent basis, a scoping framework was developed, drawing on the initial review of contextual factors (see above). This enabled changes in the assessment factors to be considered, including which should be in- or out-of-scope, in the light of information about:

- Changes in the contextual factors identified as potentially material;
 - The changes in project requirements and range of feasible options under consideration; and
- 1) Option-specific factors that could affect the performance of options against the assessment criteria, namely changes arising through design / development and in the local planning context.

This was then refined iteratively to progressively incorporate SME judgements. SWS and its advisors informed and validated the content of the framework and endorsed its conclusions in a senior decision-making workshop held on 21st August 2025. Further details of the process are provided in Appendix 3.

A wide range of contextual and option-specific changes were considered to have a potentially material impact on the consenting risk and MCDA assessments, though none of these were deemed to warrant fundamental structural changes to the assessment frameworks. A significant number of assessment criteria were considered to require reassessment, often as a result of combinations of potentially material changes in contextual factors and option-specific factors. For example, landscape impacts warranted reassessment owing to both updated duties to protect national parks and updated information on the expected impacts of the feasible options on South Downs National Park (SDNP). In other cases, the reassessment of criteria was

warranted on the basis of technical changes to appraisal methods and parameters that indicated the specification / scoring methodology of key metrics may need updating, e.g. the valuation of carbon, BNG and natural capital services.

4.3. Changes in the treatment of carbon

Owing to their potential significance, the following changes in contextual factors relating to the treatment of carbon were considered separately from the other factors:

- A change in the carbon objective, to reflect SWS's updated net zero policy. It was confirmed that the change has no material impact on the level of ambition demonstrated by the commitment across the life of the programme, which still aims to deliver whole life emissions that are as low as reasonably practicable.
- The Finch¹⁵ ruling on the treatment of downstream carbon, which the SWS carbon team confirmed had no material impact on the required scope of carbon impact assessment for the project.

Further details of the consideration given to these two contextual factors are provided below.

Net zero carbon objective

SWS updated its carbon commitment for HWTWRP in 2025. At the time of the Gate 2 OAP, the commitment stated:

"SW will deliver solutions which ensure that SW can continue to make progress towards meeting, and to support and contribute to. Water UK's commitment to become net zero carbon by 2030."

The updated commitment states:

"SW will deliver solutions in relation to design, construction and operation of the Proposed Development that are optimal in terms of whole life carbon emissions and reduce greenhouse gas (GHG) emissions to as low as reasonably practicable, having regard to the UK's climate change commitment of achieving net zero emissions by 2050."

The main reasons for updating the commitment were to:

- Combine capital and operational carbon commitments to focus on whole life carbon reduction to as low as reasonably practicable, in line with the policy test required by the National Policy Statement for Water Resources Infrastructure;
- Focus on alignment to the UK 2050 climate change commitment;
- Enable delivery of more customer value for money whole life carbon reduction opportunities not driven by the 2030 date alone;
- Manage the deliverability risks associated with the carbon commitment at the current stage of design;
- Cover a broader range of emissions than the Water UK commitment alone covers e.g. emissions associated with chemical consumption are now incorporated and strengthens the drive for Southern Water to influence its supply chain to reduce the carbon intensity of chemicals over time; and
- Although the project is not proposing to make the carbon objective a commitment of the DCO, in the event the Secretary of State opts to do so in their determination, the updated carbon chapter offers more flexibility in terms of delivering carbon mitigation measures.

¹⁵ R (Finch) v Surrey County Council & Others [2024] UKSC 20

The change has no material impact on the level of ambition demonstrated by the commitment across the life of the programme, which still aims to deliver whole life emissions that are as low as reasonably practicable. These will be monitored in alignment with the Outline Carbon Management Plan. It was concluded that the change in the net zero carbon objective was not a material factor for the purposes of the OAP review.

The *Finch* ruling

It was considered possible that the *Finch* ruling on the treatment of downstream carbon could have had implications for the assessment of the options. It was, however, confirmed by the SWS carbon team that this ruling had been considered by the project delivery team and had not resulted in a change to its carbon assessment approach. The main downstream emissions that would potentially fall under the *Finch* ruling are the downstream use of water and associated emissions, e.g. heating of the water or use in other industrial applications. The carbon team provided the following reasons for not including these impacts in HWTWRP’s carbon assessment work:

- i. The downstream emissions are not necessarily directly linked to the project, as the need for additional water into supply has already been confirmed by the WRMP. If the HWTWRP project were not delivered, the water would be supplied via an alternative project, and the downstream emissions may still occur.
- ii. There is too much variation in downstream uses, as covered above, to reasonably calculate what the likely scale of downstream emissions are; and
- iii. The downstream emissions are not "inevitable" as it is not guaranteed that the water supplied will be heated or used domestically or for industrial applications.

4.4. Outcomes of assessment factor review

The number of in-scope and out-of-scope factors identified through the review of assessment factors is shown in Table 5.

Table 5: Number of factors in- and out-of-scope

OAP process	No. of in-scope factors	No. of out-of-scope factors
Consenting risk evaluation	15	10
Multi-Criteria Decision Analysis	18	5

The agreed scoping framework, showing the changes identified for each factor by the SMEs, and the rationales for including or excluding them from the scope of the OAP review, is shown in Table 6.

Table 6: Assessment factors

Ref	Process	Description	Change since Gate 2	Material factor?	Rationale
1	Consenting	Air quality & emissions	None identified.	✗	<ul style="list-style-type: none"> No new changes to contextual factors, scheme design, or local planning developments have arisen to suggest this factor should be revisited.
2	Consenting	Biodiversity and Nature Conservation - Terrestrial - HRA	<p>Scheme Changes:</p> <ul style="list-style-type: none"> The project impacts more Functionally Linked Land (FLL) than anticipated, requiring more extensive mitigation than originally expected. Approximately half of the WRP site identified as containing Open Mosaic Habitat (OMH), introducing additional ecological constraints and requiring more extensive mitigation than originally expected. 	✓	<ul style="list-style-type: none"> This factor was a key consideration in the consenting evaluation and was identified as a notable consenting risk for the SO. Although all options were considered to carry a broadly similar level of risk in this area, the specific nature and location of those risks varied. New information has since emerged that may negatively affect the performance of the SO if the appraisal were repeated today. Given this potential shift in comparative risk, the factor warrants reconsideration as part of a targeted the OAP review.
3	Consenting	Biodiversity and Nature Conservation - Terrestrial	<p>Scheme Changes:</p> <ul style="list-style-type: none"> Scheme development work has identified a risk of uncontrolled water release leading to the spread of controlled invasive species, including potential pathways for invasive non-native species transmission. Appropriate mitigations required. 	✓	<ul style="list-style-type: none"> This factor was a key consideration in the consenting evaluation and was identified as a notable consenting risk for the SO. Although all options were considered to carry a broadly similar level of risk in this area, the specific nature and location of those risks varied. Additional risks identified through scheme development warrant reassessment of this factor.
4	Consenting	Biodiversity and Nature Conservation - Marine - HRA	<p>Contextual changes:</p> <ul style="list-style-type: none"> New guidance in the NPPF on Sustainable Drainage Systems (SuDS) is relevant to the design of drainage from the WRP site. In particular, all developments affecting drainage must now use multifunctional SuDS in line with new national standards. <p>Scheme changes:</p> <ul style="list-style-type: none"> A new SuDS outflow into the Hermitage Stream flows into Langstone Harbour and therefore interacts with a marine environment. This means a marine licence is required. 	✓	<ul style="list-style-type: none"> The requirement for a marine licence for the Hermitage Stream outflow has emerged through design changes and this should be reconsidered through the OAP review process.
5	Consenting	Biodiversity and Nature Conservation - Marine	<ul style="list-style-type: none"> Similar considerations to Biodiversity and Nature Conservation -Marine - HRA 	✓	<ul style="list-style-type: none"> As per Biodiversity and Nature Conservation -Marine - HRA
6	Consenting	Carbon	<p>Contextual changes:</p> <ul style="list-style-type: none"> Carbon and climate impacts are increasingly emphasised by the industry's stakeholders, including government, regulators, and the general public. However, at the same time, SWS's operational net zero target has been delayed from 2030 to 2050. The "Finch case" clarifies the assessment of downstream 'Scope 3' emissions, potentially changing the scope of the assessment of whole-life carbon impacts and of Judicial Review risks. The IEMA published an update to its guidance on carbon management in 2022. <p>Scheme changes:</p> <ul style="list-style-type: none"> There has been a significant change in scheme purpose from a resilience asset to an asset that is designed to meet everyday water supply requirements. The resulting changes in scheme design / specification are expected to increase both the operational and embodied carbon impacts. For the operational carbon there is potential for offsetting through the use of a Power Purchase Agreement that would ensure the use of renewable energy sources. There has been a delay to the scheme becoming operational (from 2030 to 2034). 	✓	<ul style="list-style-type: none"> A review of the carbon impacts of the options should be undertaken, given the changes in scheme purpose and associated changes in design specification. In addition, consideration should be given to the impacts of the delay to scheme opening on SW's ability to meet the Water UK Net Zero operational carbon target by 2030. The differences between the SO and BUO in Scope 3 emissions should be reassessed, to a standard commensurate with an initial optioneering exercise. A similar assessment should be undertaken at a higher level for the other, discounted options to provide an indicative view.
7	Consenting	Coastal change processes	<p>Local planning changes:</p> <ul style="list-style-type: none"> A new CCMA was adopted in the 2023 Fareham Local Plan, but none of the options are located in this area. 	✗	<ul style="list-style-type: none"> All options were assessed as having minor or no consenting risk for both construction and operational phases. Further assessment has concluded that no effects are anticipated. This discipline has been scoped out of the EIA.
8	Consenting	Geology and Soils	<p>Scheme changes:</p> <ul style="list-style-type: none"> There is a risk of mobilising contamination from the underlying landfill during construction of the WRP site. This issue was identified as a consenting consideration for the SO in the Gate 2 OAP. Subsequent assessments as part of site selection work, ground investigations and environmental impact assessment continued to identify this risk and consultation feedback has indicated that the risk is greater than anticipated at Gate 2. 	✓	<ul style="list-style-type: none"> Given the current classification of the construction risk as moderate, and the absence of any operational risks, a re-evaluation of this factor is warranted in light of new information relating to landfill contamination risk assessments and consultation feedback.
9	Consenting	Historic Environment - Terrestrial	<p>Scheme changes:</p> <ul style="list-style-type: none"> The scheme design now includes more tunnelling than was anticipated at Gate 2. There is a higher chance of encountering unknown archaeology and undesignated heritage assets. At the Options Appraisal Stage, two risks were identified that have now been resolved through detailed design decisions: <ul style="list-style-type: none"> The SO previously crossed Staunton Country Park which is a designated heritage asset of the highest significance'. The detailed routing no longer crosses this asset so is not relevant to the ongoing OAP review; The routing area was drawn broadly at Gate 2 and suggested it could run close to the Portsdown Forts which could be disturbed. The actual routing now is further away from Portsdown Forts which reduces the relevance of this risk. <p>Local planning changes:</p> <ul style="list-style-type: none"> Undesignated heritage assets have been discovered along the route, e.g. two WW2 crash sites. 	✓	<ul style="list-style-type: none"> This factor influenced the selection of the SO and the BUO as risks associated with the desalination options were considered more material. This conclusion should be revisited in light of the more extensive tunnelling requirements and detailed routing.

Ref	Process	Description	Change since Gate 2	Material factor?	Rationale
10	Consenting	Historic Environment – Marine	Scheme changes: <ul style="list-style-type: none"> The project now includes an outfall into the Hermitage Stream, below Mean High Water Spring (MHWS). As a result, marine licence will now be required (currently intended to be deemed in DCO) to cover this outfall. However, a marine licence would already have been required for pipe working leading to the WRP, so the requirement in principle is not a Material Change. 	✗	<ul style="list-style-type: none"> Detailed assessment of the new Hermitage Stream outflow has not identified any likely significant effects on marine historic environment receptors. It is not considered that this change is likely to affect the outcomes of the Gate 2 OAP.
11	Consenting	Landscape / Seascape and Townscape and Visual Amenity	Contextual changes: <ul style="list-style-type: none"> Section 245 of the Levelling Up and Regeneration Act 2023 requires that authorities must seek to "further the purpose" of Protected Landscapes (National Parks and National Landscapes) rather than the former duty to just 'have regard' to them. 	✓	<ul style="list-style-type: none"> This factor influenced the selection of the SO and the BUO. It was a key consideration as all options were likely to have an impact on nationally and regionally important sites. Specifically, the SO and BUO were anticipated to impact the South Downs National Park. The scheme development process has focused on reducing the impact on the SDNP from the HWTWRP project. Reassessment is warranted due to the strengthened duty to further the purpose of National Parks as defined in the Levelling Up and Regeneration Act 2023.
12	Consenting	Major accidents and disasters	Scheme changes: <ul style="list-style-type: none"> The scheme has evolved from being a drought-specific measure to being required all year round, as per WRMP 24. This change has necessitated an increase in the use of the WRP, which means a greater quantity of chemicals will be stored on site. It was confirmed that this will not bring the WRP site within the scope of CoMAH and it is considered very unlikely that the Hazardous Substances Consent regime (overseen by the HSE) will apply. 	✗	<ul style="list-style-type: none"> A detailed assessment of this factor has been undertaken for the SO as part of the EIA. A risk that the WRP site would be classified as a COMAH site was identified in the Gate 2 OAP. Though it is now known that it will not be, the site is nevertheless within the scope of the Hazardous Substances regime.
13	Consenting	Noise and Vibration	Scheme changes: <ul style="list-style-type: none"> increased tunnelling, though sufficient mitigation has been identified and there are no longer any residual significant effects. 	✗	<ul style="list-style-type: none"> Though increased use of tunnelling in the design raised the risk of noise and vibration effects, mitigations have been identified and there are no residual effects. A review of this factor is therefore not warranted.
14	Consenting	Resource and waste management	Scheme changes: <ul style="list-style-type: none"> The land assessment states leachate is a risk (not residual) for construction and operation but concludes all effects are Minor Adverse (not significant) Local planning changes: <ul style="list-style-type: none"> Hampshire CC has produced an updated Minerals and Waste Plan. This has slightly changed the baseline for some minerals which are now scarcer than anticipated during the Gate 2 OAP. 	✓	<ul style="list-style-type: none"> The Gate 2 OAP identified risks associated with the WRP parcel's previous use as a landfill. At the time, these risks were considered minor, but the Gate 2 OAP document highlighted the need for further assessment and mitigation. Reassessment of this factor is warranted to confirm whether or not the rating of these risks should be changed in light of subsequent assessment.
15	Consenting	Socio-economic impact	Contextual changes: <ul style="list-style-type: none"> Section 245 of the Levelling Up and Regeneration Act 2023 requires that authorities must seek to "further the purpose" of National Parks rather than former duty to just 'have regard' to them. Scheme changes: <ul style="list-style-type: none"> The revised scheme design is larger which may have a slight positive impact on the employment receptor 	✗	<ul style="list-style-type: none"> The changes to contextual factors and scheme design identified are unlikely to have a material impact on the outcomes of the Gate 2 OAP. Any change in employment is likely to be minor as the Gate 2 OAP anticipated only 10 FTE jobs during the operational phase. Furthermore, the construction and operation of the SO and the BUO is not likely to restrict access to the South Downs National Park.
16	Consenting	Traffic and Transport	Contextual changes: <ul style="list-style-type: none"> IEEMA guidance on transport has been updated, but the only substantive change (i.e. that could potentially change the significance of effects) to the guidelines relates to the assessment of Fear and Intimidation. Scheme changes: <ul style="list-style-type: none"> The revised scheme design requires a greater number of compounds during construction than anticipated in the Gate 2 OAP, owing to the increased length of tunnelling. The scheme has a higher capacity than envisaged in 2021, which means constructing larger assets and this in turn will create a greater volume of construction traffic. The ~10x increase in the size of the EBL could materially change the scale of traffic impacts in the case of the Back Up Option. 	✓	<ul style="list-style-type: none"> The Gate 2 OAP identified a consenting risk associated with construction traffic for all options. This was most significant for the desalination options related to the construction in the Hythe Bypass. It is likely that the construction impacts associated with the revised scheme design are slightly greater in magnitude than was anticipated in the Gate 2 OAP. However, it is unlikely that these effects would be known at a level of detail commensurate with an initial optioneering exercise. A major increase the required size of the EBL, which forms part of the Back Up Option, does however warrant reconsideration of the consenting risks in relation to traffic impacts.
17	Consenting	Water Quality and Resources	Contextual changes: <ul style="list-style-type: none"> The EA is planning to increase the threshold above which water can be drawn from rivers which would reduce water available from the environment for abstraction in order to achieve Environmental Destination (ED) objectives. Since 2021 there has been increased public and regulatory scrutiny of water companies, which has increased their focus on factors that affect their reputation, particularly concerning sewage treatment processes. 	✗	<ul style="list-style-type: none"> Environmental Destination (ED) changes will be reflected in SW's WRMP24 and are factored into the scheme objectives and design.
18	Consenting	Flood Risk	Contextual changes: <ul style="list-style-type: none"> Since the December 2024 revisions to the National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG), the Sequential Test for flood risk is getting more attention, reflecting case law development. Legal challenges to decisions have been made on the basis of alleged non-compliance with the sequential test to try and overturn decisions. Recent case law has also confirmed that the sequential test applies to all types of flooding (not just fluvial) and this is reflected in the updated PPG. The EA has published updated flood risk mapping 2024/25. 	✓	<ul style="list-style-type: none"> The consenting risks associated with flood risk for the preferred sites should be reviewed in line with the strengthened sequential test requirements of the updated NPPF.
19	Consenting	Interface with Future Development and Planning	Scheme changes: <ul style="list-style-type: none"> The previous planning permission for Site 72 has now expired, and Havant propose to de-allocate the site as an employment site. This reduces the consenting risks associated with planning permission. Local planning changes: <ul style="list-style-type: none"> Options may interface with any new allocations in emerging or adopted local plans that LPAs are developing. It has become clear that the construction traffic route to access the preferred pipeline near Welbourne Garden Villages is likely to conflict with major roadworks as part of that development. The owner of Five Oaks Farm is understood to be considering submitting a planning application for the extraction of minerals, which may conflict with the pipeline route. 	✓	<ul style="list-style-type: none"> The local planning changes identified since the Gate 2 OAP could present consenting risks that were not known in 2021. The changes of the planning status on 72 reduces these risks and therefore justifies a targeted review as part of the OAP review.
20	Consenting	Land Use (Special Category Land)	None identified.	✗	<ul style="list-style-type: none"> No new changes to contextual factors, scheme design, or local planning developments have arisen.
21	Consenting	Green Belt	Contextual changes: <ul style="list-style-type: none"> Grey Belt policy was introduced in revisions to the NPPF in December 2024 and this was clarified in an update to NPSWRI in July 2025. Grey Belt designation applies to sites within the Green Belt that have been previously developed or are deemed to not strongly contribute to Green Belt purposes, enabling greater weight to be given in planning decisions to housing and infrastructure needs. 	✗	<ul style="list-style-type: none"> The options have no Green Belt impacts and therefore the introduction of Grey Belt designation is not relevant.

Ref	Process	Description	Change since Gate 2	Material factor?	Rationale
22	Consenting	Technology and compliance regulatory approvals with	None identified	✘	<ul style="list-style-type: none"> No new changes to contextual factors, scheme design, or local planning developments have arisen.
23	Consenting	Constructability	<p>Scheme changes:</p> <ul style="list-style-type: none"> The scheme footprint is now larger and requires more tunnelling. This is likely to result in more construction traffic movements and a greater number of compounds. Assessment undertaken since Gate 2 has suggested there are greater than anticipated residual risks in the construction phases associated with building on a landfill site. 	✓	<ul style="list-style-type: none"> Reassessment of this factor is warranted in light of the higher scheme capacity requirements which necessitate a larger and more complex design.
24	Consenting	Resilience	<p>Contextual changes:</p> <ul style="list-style-type: none"> The supply-demand gap at Gate 2 was driven by the need identified at WRMP19 which was prepared to meet a drought resilience standard of 1-in-200-year drought as set by the WRPG for WRMP19. For WRMP24 the WRPG requires a higher resilience standard at 1-in-500 driving a higher supply demand gap for Hampshire. The EA is planning to increase the threshold at which water can be drawn from rivers. This could increase the urgency of scheme delivery. <p>Scheme changes:</p> <ul style="list-style-type: none"> The scheme was originally developed and planned as a resilience asset, i.e. it was not intended to be used regularly for standard water supply, but rather in the event of a drought. This has changed, with the scheme to be used to meet daily supply needs as well as a 1-in-500-year drought planning requirement for WRMP24 as identified in the FNA. The design has evolved, and it now has a greater reliance on FE than anticipated during the Gate 2 OAP. 	✓	<ul style="list-style-type: none"> In the Gate 2 OAP the BUO relied entirely on the supply of FE. The revised design of the SO now has a significantly greater reliance on FE than assumed in the Gate 2 OAP, which warrants reassessment of this factor.
25	Consenting	Cost	<p>Scheme changes:</p> <ul style="list-style-type: none"> Since the Gate 2 OAP there has been an increase in both CAPEX and OPEX, including as a result of both general construction cost inflation and changes in scheme specification. These include, inter alia: <ul style="list-style-type: none"> the increased length of tunnelling required, from 1km to 6km; The increase in the size of the Water Recycling Plant resulting from the evolution of the scheme from a drought-specific measure to being required all year round, as per WRMP 24. The cost of interim measures are likely to have increased since the Gate 2 OAP, however no updated estimate is available. 	✓	<ul style="list-style-type: none"> Reassessment of this factor is warranted in light of the material higher CAPEX and OPEX requirements.
CO1	MCDA	Tap water quality	None identified	✓	<ul style="list-style-type: none"> Since this sub-criterion was scored at Gate 2 it is retained to support consistency and comparability of the updated MCDA results with the Gate 2 MCDA results.
CO2	MCDA	Resilience of supply	<p>Contextual changes:</p> <ul style="list-style-type: none"> The National Policy Statement for Water Resources Infrastructure (NPSWRI) was updated in 2025. This now explicitly requires water resource infrastructure projects to be designed to address future pressures on public water supply The EA is planning to increase the threshold at which water can be drawn from rivers (ED). This could increase the urgency of scheme delivery. <p>Scheme changes:</p> <ul style="list-style-type: none"> The scheme has evolved from being a drought-specific measure to also being required to meet normal daily needs, as per WRMP24, necessitating scheme changes including a material increase in the size of the Water Recycling Plant. 	✓	<ul style="list-style-type: none"> Reassessment is warranted as the design changes may have changed some of the risk factors associated with resilience, e.g. exposure to risk of single system failure.
E.01	MCDA	Biodiversity Net Gain (BNG)	<p>Contextual changes:</p> <ul style="list-style-type: none"> The BNG regime requirement BNG of at least 10% to be delivered by Nationally Significant Infrastructure Projects (NSIPs) will become a statutory requirement from May 2026. <p>Scheme changes:</p> <ul style="list-style-type: none"> An updated BNG assessment has been undertaken for the scheme. Half of the WRP site has been identified as containing Open Mosaic Habitat (OMH), which is a habitat of principal importance governed by Section 41 of the Natural Environment and Rural Communities Act 2006. The updated Biodiversity Net Gain (BNG) statement removes the preference for on-site delivery. 	✓	<ul style="list-style-type: none"> This factor influenced the selection of the SO and BUO as there was significant variation across the options in the original MCDA. Reassessment is warranted given that an updated BNG assessment has been prepared that takes account of the adverse effects during construction and operation and associated mitigations. Furthermore, this factor is treated as increasingly important by stakeholders including the EA.
E.02	MCDA	Habitats & biodiversity	<p>Scheme changes:</p> <ul style="list-style-type: none"> The project impacts more Functionally Linked Land (FLL) than anticipated, requiring more extensive mitigation than originally expected. It has been identified that approximately half of the WRP site contains Open Mosaic Habitat (OMH), introducing additional ecological constraints and requiring more extensive mitigation than originally expected. More work has been carried out regarding the risk of uncontrolled water release leading to the spread of controlled invasive species, including identifying potential pathways for invasive non-native species transmission and developing appropriate mitigations. This level of assessment was not anticipated during the Gate 2 OAP. There is a new SuDS outflow into the Hermitage Stream flows into Langstone Harbour and therefore interacts with a marine environment and requires a marine licence. 	✓	<ul style="list-style-type: none"> This factor was a key differentiator between options in the MCDA. New information has since emerged that may negatively affect the performance of the SO if the appraisal were repeated today. Given this potential shift in comparative risk, the factor warrants reconsideration as part of the OAP review.
E.03	MCDA	Climate regulation (NC)	<p>Contextual changes:</p> <ul style="list-style-type: none"> There have been changes in official guidance and appraisal standards - for example, the Environment Agency's Water Resources Planning Guideline (WRPG) and its supplementary guidance on adaptive pathways and resilience, and Department for Energy Security and Net Zero (DEZLN) carbon valuation guidance. <p>Scheme changes:</p> <ul style="list-style-type: none"> The updated scheme design and higher supply requirements will impact the natural carbon sequestration effects of the SO. It is not clear that a similar increase in land take would be required for the BUO because this scheme was assumed to meet the current requirement. 	✓	<ul style="list-style-type: none"> The recycling and transfer options performed significantly worse than the desalination options in this element of the MCDA. Reassessment of this factor is warranted as the additional land take will adversely impact the NC scoring for the SO.

Ref	Process	Description	Change since Gate 2	Material factor?	Rationale
E.04	MCDA	Natural hazard regulation (NC)	<p>Contextual changes:</p> <ul style="list-style-type: none"> The Government's ENCA (Enabling a Natural Capital Approach) Guidance has been updated in July 2023 and February 2025. This includes additional guidance on valuing biodiversity. <p>Scheme changes:</p> <ul style="list-style-type: none"> The ONS Natural Capital Accounting has been updated in 2023 and 2024. This is a key data input into NC assessments. The updated scheme design and higher supply requirements may impact the natural hazard regulation effects of the SO. It is not clear that a similar increase in land take would be required for the BUO because this scheme was assumed to meet the current requirement. 	✓	<ul style="list-style-type: none"> The desalination options performed significantly better than the recycling and transfer options in this element of the MCDA. Reassessment of this factor is warranted as the additional land take will adversely impact the NC scoring for the SO.
E.05	MCDA	Air quality - natural pollutant removal (NC)	<p>Contextual changes:</p> <ul style="list-style-type: none"> The Government's ENCA (Enabling a Natural Capital Approach) Guidance has been updated in July 2023 and February 2025. This includes additional guidance in valuing biodiversity. The ONS Natural Capital Accounting has also been updated in 2023 and 2024. This is a key data input into NC assessments. <p>Scheme changes:</p> <ul style="list-style-type: none"> The updated scheme design and higher supply requirements may impact the natural pollutant removal effects of the SO. It is not however possible to distinguish a meaningful difference in outcomes between the SO and BUO. 	✗	<ul style="list-style-type: none"> No changes to contextual factors, scheme design, or local planning developments were identified that would warrant assessment in the updated MCDA. Since this sub-criterion was not included in the Gate 2 MCDA results, it is not necessary to include it for the purposes of consistency and comparability.
E.06	MCDA	Water purification (NC)	<p>Contextual changes:</p> <ul style="list-style-type: none"> The Government's ENCA (Enabling a Natural Capital Approach) Guidance has been updated in July 2023 and February 2025. This includes additional guidance in valuing biodiversity. The ONS Natural Capital Accounting has also been updated in 2023 and 2024. This is a key data input into NC assessments. <p>Scheme changes:</p> <ul style="list-style-type: none"> The updated scheme design and higher supply requirements may impact the water purification effects of the SO. It is not clear that a similar increase in land take would be required for the BUO because this scheme was assumed to meet the current requirement. 	✓	<ul style="list-style-type: none"> Reassessment of this factor is warranted as there have been significant changes in scheme design, which may affect the impact on water purification services
E.07	MCDA	Food production / agric. services (NC)	<p>Contextual changes:</p> <ul style="list-style-type: none"> The Government's ENCA (Enabling a Natural Capital Approach) Guidance has been updated in July 2023 and February 2025. This includes additional guidance in valuing biodiversity. The ONS Natural Capital Accounting has also been updated in 2023 and 2024. This is a key data input into NC assessments. The ONS Farm Business Survey which the underlying monetary estimates are based on has been updated. <p>Scheme changes:</p> <ul style="list-style-type: none"> The updated scheme design and higher supply requirements may impact the food production / agricultural services effects of the SO. 	✓	<ul style="list-style-type: none"> Reassessment of this factor is warranted as the methodological and scheme changes identified could affect option performance.
E.08	MCDA	Embodied & operational carbon	<p>Contextual changes:</p> <ul style="list-style-type: none"> Carbon and climate impacts are increasingly emphasised by the industry's stakeholders, including government, regulators, and the general public. The IEMA published an update to its guidance on carbon management in 2022. Updated DESNZ carbon valuation guidance used in cost-benefit analysis. <p>Scheme changes:</p> <ul style="list-style-type: none"> The updated scheme design and higher supply requirements may impact the embodied and operational carbon effects of the SO. It is not clear that a similar increase in land take would be required for the BUO because this scheme was assumed to meet the current requirement. 	✓	<ul style="list-style-type: none"> An updated carbon assessment for HWTWRP has been undertaken. This should be integrated into a revised MCDA to capture the change in emissions associated with the new scheme design. A similar assessment should be undertaken at a higher level for the BUO to provide an indicative view. SWS's operational net zero target has been delayed from 2030 to 2050, which reflects difficulties in retrofitting existing assets.
E.09	MCDA	Exposure to noise	<p>Scheme changes:</p> <ul style="list-style-type: none"> Although more extensive tunnelling and trenchless work is planned than had been anticipated at Gate 2, sufficient mitigation has been identified and embedded to address all residual noise and vibration effects. 	✗	<ul style="list-style-type: none"> Although there have been design changes that could lead to increased noise impacts, adequate mitigation has been identified and embedded in the scheme. Reconsideration is not therefore warranted. Since this sub-criterion was not included in the Gate 2 MCDA results, it is not necessary to include it for the purposes of consistency and comparability.
E.10	MCDA	Air quality from infrastructure operations	None identified.	✗	<ul style="list-style-type: none"> No changes to contextual factors, scheme design, or local planning developments were identified that would warrant assessment in the updated MCDA. Since this sub-criterion was not included in the Gate 2 MCDA results, it is not necessary to include it for the purposes of consistency and comparability.
E.11	MCDA	Environmental water quality	None identified.	✗	<ul style="list-style-type: none"> No changes to contextual factors, scheme design, or local planning developments were identified that would warrant assessment in the updated MCDA. Since this sub-criterion was not included in the Gate 2 MCDA results, it is not necessary to include it for the purposes of consistency and comparability.
E.12	MCDA	Water abstraction	<p>Contextual changes:</p> <ul style="list-style-type: none"> The EA has plans to require water companies to reduce the amount of water that they abstract from the environment. These expected future abstraction limits have been reflected in WRMP24 development and scheme design changes. <p>Local planning changes:</p> <ul style="list-style-type: none"> Changes in the amount of water that can be abstracted from the environment have been reflected in the modelling supporting WRMP24. 	✓	<ul style="list-style-type: none"> Differential impacts on existing water resources that could be subject to greater restrictions in the future were considered sufficient to warrant a review of this factor..
E.13	MCDA	Landscape & townscape impacts	See consenting process - Landscape / Seascape and Townscape and Visual Amenity (11)	✓	<ul style="list-style-type: none"> The consenting evaluation found changes to contextual factors that would warrant a reassessment of this factor.

Ref	Process	Description	Change since Gate 2	Material factor?	Rationale
E.14	MCDA	Flood risk	See consenting process - Flood Risk (18)	✓	<ul style="list-style-type: none"> The consenting evaluation found changes to contextual factors that would warrant a reassessment of this factor. This MCDA factor should be reassessed as it is directly based on the consenting evaluation rating.
E.15	MCDA	Coastal process impacts	None identified.	✓	<ul style="list-style-type: none"> The consenting evaluation found no changes to contextual factors, scheme design, or local planning developments that would warrant a reassessment of this factor. Since this sub-criterion was scored at Gate 2 it is retained to support consistency and comparability of the updated MCDA results with the Gate 2 MCDA results..
S.01	MCDA	Recreation amenity (NC) &	Scheme changes: <ul style="list-style-type: none"> The updated scheme design requirements may impact the recreation and amenity effects of the SO. The change in the size of the EBL (10 x increase in capacity) may affect the performance of the BUO. 	✓	<ul style="list-style-type: none"> Reassessment of this factor is warranted as the additional land take will adversely impact the NC scoring for the SO.
S.02	MCDA	Historic environment (terrestrial)	See Historic Environment – Terrestrial	✓	<ul style="list-style-type: none"> The consenting evaluation found changes to scheme design and local planning developments that would warrant a reassessment of this factor. This MCDA factor should be reassessed as it is based on a consenting evaluation rating.
S.03	MCDA	Historic environment (marine)	None identified.	✗	<ul style="list-style-type: none"> The consenting evaluation found no changes to contextual factors, scheme design, or local planning developments that would warrant a assessment of this factor. Since this sub-criterion was not included in the Gate 2 MCDA results, it is not necessary to include it for the purposes of consistency and comparability.
D.01	MCDA	Supply chain capacity	Contextual changes: <ul style="list-style-type: none"> There have been several changes to external pressures on the supply chain outside of the WfLH scheme. When the Gate 2 OAP was carried out, the key concerns were competing infrastructure over the same period, the COVID-19 Backlog, and EU exit. Additional pressures have since emerged, including rising materials and labour costs, global instability and substantial competition for resources owing to increases in the scale of water industry investment. Scheme changes: <ul style="list-style-type: none"> The scheme is now larger and more complex, with higher capex and construction requirements. 	✓	<ul style="list-style-type: none"> The WRP options performed significantly better than the desalination options in this element of the MCDA. Assessment of this factor is largely affected by external influences. These have changed significantly since 2021 which warrants reassessment.
A.01	MCDA	Whole life cost of option	Scheme changes: <ul style="list-style-type: none"> Since the Gate 2 OAP there have been changes in both CAPEX and OPEX, including as a result of both general construction cost inflation and changes in scheme specification. These include, inter alia: <ul style="list-style-type: none"> the increased main tunnelling required from 1km to 4km (but removal of part of the pipeline between Bedhampton Springs and Havant Thicket Reservoir) The increase in the size of the Water Recycling Plant resulting from the evolution of the scheme from a drought-specific measure to being required all year round, as per WRMP 24. 	✓	<ul style="list-style-type: none"> Whole Life Cost was a decisive factor in the relative performance of Option B.4 and B.5 in the MCDA rankings. Reassessment of this factor is warranted in light of the higher CAPEX and OPEX requirements. <p>Updated cost information to be provided by the Cost Intelligence Team for the SO and BUO to inform this assessment.</p>
A.03	MCDA	Cost of interim measures to meet required supply in 2027	Contextual changes: <ul style="list-style-type: none"> The EA is planning to increase the threshold above which water can be drawn from rivers i.e. limit abstraction from the environment. This could accelerate the need for the current scheme to be delivered faster. Scheme changes: <ul style="list-style-type: none"> The cost of interim measures are likely to have increased since the Gate 2 OAP, however no updated estimate is available There has been a delay to the delivery timetable of the scheme, which is expected to increase the cost of interim measures. 	✓	<ul style="list-style-type: none"> The cost of interim measures was a decisive factor in the relative performance of Option B.4 and B.5 in the MCDA rankings. Reassessment of this factor is warranted in light of the likely higher cost of interim measures and the fact that delivery timescales associated with the SO and BUO have changed.

5 Overview of Site and Route Selection Process

5.1. Introduction

This section sets out an overview of the site and route selection process for the SO, and demonstrates how the site and route selection process has considered any changes in material factors on a continuing basis (see Sections 2 to 6 of the Scheme Development Report).

This section summarises the site and route selection process, and scheme development that has been undertaken since RAPID Gate 1 through to submission of the DCO application to develop the core components of the SO, including the Water Recycling Plant (WRP) site, pipeline routes, and AGP sites which are required along pipeline routes.

5.2. Site and Route Selection Process

The design of the Project has developed in line with the following stages:

Stage 1: RAPID Gate 1 – Strategic water resource infrastructure options were identified for comparison against the WRMP19 base case, and an assessment of their feasibility was undertaken. Site or route selection had not been undertaken at this very early stage, however the reporting in the Gate 1 submission set out the criteria that would be used for site and route selection at later stages. The reporting also identified a conceptual site for the WRP and pipeline routes to inform the assessment of feasibility for the infrastructure options. Given this stage did not comprise any site or route selection, this stage is not explained further in this Section,

Stage 2: RAPID Gate 2 Options Appraisal Process – The solution options were compared with one another to identify the best value option and confirm selection of the Project as the preferred solution. The initial site and route selection for the WRP site and pipeline routes was undertaken, which informed the comparison of solution options as part of the options appraisal process. Details of the site and route selection criteria are shown in Appendix 4.

Stage 3: Options Appraisal Process to Summer 2022 Consultation – The pipeline routes identified at Gate 2 were expanded into corridors, and a preferred pipeline corridor was selected and consulted on. Zones for AGP were also identified and preferred zones were selected and consulted on.

Stage 4: Summer 2022 Consultation to Summer 2024 Consultation – An OAP review of the Gate 2 WRP site selection was undertaken to respond to consultation feedback, consider new environmental and technical information, and incorporate revised minimum site size assumptions. A pipeline route and construction working areas within the preferred pipeline corridor were identified.

Stage 5: Summer 2024 Consultation to Spring 2025 Consultation – Continued development of the pipeline routes, AGP and construction areas in response to consultation feedback, assessments and investigations. This stage also included further review of the WRP site selection, considering new environmental information.

Stage 6: Spring 2025 Consultation to DCO Application – Refinement of the pipeline routes, AGP and construction areas in response to consultation feedback, assessments and investigations.

5.3. Stage 2: RAPID Gate 2 Options Appraisal Process

WRP Site Selection

The initial WRP site selection comprised the following four stages:

- (i) Identification of a search area from Budds Farm Wastewater Treatment Works (WTW);
- (ii) Identification of sites within the search area;

- (iii) Evaluation of a long list of sites to establish a shortlist;
- (iv) Evaluation of the shortlist of sites to select a preferred site.

The WRP site selection comprised a two-part process: Firstly, a 1.5km search area around Budds Farm WTW was identified and areas of coastline susceptible to sea flooding and coastal erosion were excluded; Secondly, parcels of land were identified within the search area, in line with the criteria shown in Table 7. This resulted in 17 sites being identified.

Table 7: WRP site identification criteria

Element	Details
Land use	Avoidance of the following areas: <ul style="list-style-type: none"> ▪ Densely populated residential areas, private residences, care homes, hospitals, schools, universities, places of worship, burial grounds, holiday parks, hotels, retail parks and leisure parks. ▪ Key transport infrastructure. ▪ Key utilities.
Land conditions	Avoidance of marshes, mudflats, cliff faces and open water due to significant construction and engineering challenges.
Site size	61 Ml/d WRP - Minimum of 40,470 m ² (4ha) + 4,047 m ² (0.4ha) for construction

The seventeen sites were assessed against a set of planning considerations to identify a short list of sites. This included considering the following planning designations:

- Special Areas of Conservation / Ramsar / Special Protection Area (including potential and candidate sites)
- Site of Special Scientific Interest / National Nature Reserve
- Scheduled Monuments
- National Parks / Areas of Outstanding Natural Beauty / Green Belt
- Ancient Woodland
- Grade 1 and 2* Registered Parks and Gardens and Listed Buildings and Battlefield Sites;
- Residential (noise/vibration and air quality impact)
- Hospitals, Care Homes, Schools
- Amenity Spaces e.g., allotments, public parks, playgrounds, playing fields

The sites were considered in terms of their proximity to these designations, resulting in a short list of seven best performing sites. Some sites did not progress because of their proximity to ecological sites in Langstone Harbour, and other sites were near residential areas.

The seven shortlisted sites were then assessed against additional environmental, planning and engineering considerations, such as flood risk, ground conditions, ground contamination, historic environment and transport accessibility. Approved or accepted DCO applications made within five years, or developments screened or determined to be EIA developments or subject to Transport and Works Orders within three years, were also taken into account. The five best forming site progressed for further assessment.

These five sites were evaluated to consider their consenting risk, with reference to the draft National Policy Statement for Water Resources Infrastructure (NPSWRI),¹⁶ the National Planning Policy Framework, and other relevant planning and environmental policy and regulations. The criteria considered were:

- Biodiversity and Nature Conservation;
- Historic Environment;
- Landscape / Seascape and Townscape and Visual Amenity;
- Water Quality and Resources;
- Flood Risk;
- Interface with Future Development and Planning;
- Land Use.

The assessment resulted in WRP_71 and WRP_72 being identified as the most suitable options for the WRP. WRP_71 was already developed, with existing/active warehousing and office uses sited on it. As a result, it was considered more difficult to deliver and develop than WRP_72, as it would require displacement of existing businesses and redevelopment of the site. WRP_72 was therefore identified as the preferred site, with WRP_71 as an alternative, if WRP_72 can't be delivered.

Pipeline Routes

The initial pipeline routes that were identified at Gate 1 were evaluated against the criteria listed above for the WRP site selection. This resulted in the shortlisting of four pipeline routes that progressed for further development at the next stage.

5.4. Stage 3: Options Appraisal Process to Summer 2022 Consultation

WRP Site Selection

A review of the WRP site selection was undertaken as the minimum parcel size had increased from 4 hectares to 6 hectares, so that a 15 mega litres per day (ML/d) WRP with potential to expand up to 60ML/d could be accommodated. This was driven by outputs from the Regional Plan which indicated 60ML/d would be needed by 2040. The review comprised re-running the WRP site selection process described in Section 5.3., with sites smaller than 6 hectares removed. This resulted in WRP_72 remaining as the preferred site.

Pipeline Route and AGP Site Selection

The initial pipeline routes identified at the previous stage were expanded into pipeline corridors. These identified zones within which the pipelines might be located, prior to the collection of detailed data on the localised constraints needed to inform further route development within those zones. Zones for AGP were also identified within the pipeline corridors which were informed by hydraulic modelling and engineering considerations.

An evaluation of the pipeline corridor sections and AGP zones was undertaken against the criteria set out in Appendix 4. This evaluation was supported by baseline data collection.

¹⁶ At the time of the Gate 2 Options Appraisal Process, the NPSWRI was at draft stage.

Preferred pipeline corridors and AGP zones were selected, reflecting the consenting and technical risks identified in the evaluation. The outcomes of this process were consulted on at the Summer 2022 Consultation.

5.5. Stage 4: Summer 2022 Consultation to Summer 2024 Consultation

WRP Site Selection

The location of the preferred WRP site, along with the site selection process, was presented at the Summer 2022 Consultation. Feedback received from a number of stakeholders queried the selection process. A further review of the site selection process was carried out to ensure that all reasonable alternative sites for the WRP had been considered and reviewed.

The review consisted of the following three key parts:

- All sites that had been identified through the site selection at Stage 2 and Stage 3 were re-reviewed. Sites that had the potential for significant adverse impacts were not progressed;
- As a result of feedback from stakeholders identifying that there was potential for developed employment sites in the proximity of Budds Farm WTW to become available, the Applicant considered new sites that hadn't been previously identified. Sites that had the potential for significant adverse impacts were not progressed;
- A land availability and cost review was undertaken on the sites where the risk of significant adverse impacts was not identified in the previous two stages.

The review concluded that WRP_72 remained the best performing site for the WRP against the site selection criteria considered. This was also considered to be the highest-ranking site in the land availability and cost review. This was because it was an undeveloped site, and presented lower environmental, planning and deliverability risks than the alternatives, which all had greater environmental constraints, or existing development.

Pipeline Route and AGP Site Selection

Within the preferred pipeline corridor that was presented at the Summer 2022 Consultation, the design of the Project was refined to identify draft Order Limits which included land required for construction, as well as sites for the AGP within the AGP zones. The refinements were informed by consultation feedback, continued engagement with stakeholders and landowners, environment survey findings, and engineering and technical requirements. The criteria in Appendix A were used to refine the design.

5.6. Stage 5: Summer 2024 Consultation to Spring 2025 Consultation

WRP Site Selection

Following the Summer 2024 Consultation, further environmental surveys of the WRP site were undertaken to support the EIA process. This identified the presence of open mosaic habitat, which is a priority habitat, at the WRP site. A Check of the previous stages of the WRP site selection process was therefore undertaken to verify whether the presence of open mosaic habitat would result in WRP_72 being viewed as less preferable for the location of the WRP. This Check did not result in any changes to the WRP site selection outcomes, as it was considered that the presence of open mosaic habitat could be mitigated to an acceptable level, and therefore the environmental reviews in the previous stages of the WRP site selection remained up to date.

Pipeline Route and AGP Site Selection

This stage followed a similar process for refining the Project to that outlined in paragraph 5.4.

5.7. Stage 6: Spring 2025 Consultation to DCO Application

WRP Site Selection

No further WRP site selection was undertaken at this stage.

Pipeline Route and AGP Site Selection

At this stage feedback from the Spring 2025 Consultation was reviewed and some minor refinements were made to incorporate new information into the design process, to ensure the previous site and route selection remained valid considering this new information. This stage also considered design refinements originating from:

- Environmental assessment to inform the Environmental Statement, such as the incorporation of additional land for mitigation;
- Environmental surveys, including arboriculture surveys;
- Review of construction accesses and construction vehicle access routes;
- Feedback from ongoing stakeholder and landowner engagement.

5.8. Conclusion

The site and route selection process, as part of the development of the SO, has been ongoing since the RAPID Gate 2 OAP and throughout Stages 2 to 6, enabling any updates or changes in factors that are material to the development of the SO to be incorporated on an ongoing basis. As a result, a specific review of the site and route selection process undertaken at Gate 2 is not required as part of the Gate 2 OAP review as this would not reveal a different outcome for the SO.

6 Consenting Risk Assessment

6.1. Introduction

This section sets out the approach to reviewing and updating the Gate 2 OAP consenting risk evaluation, along with the results of the review. The aim of the Gate 2 evaluation was to ensure the optioneering process took appropriate account of risks associated with meeting core legislative and policy requirements in future consenting and decision-making processes. It identified potential consenting risks associated with both scheme construction and operations, along with potential mitigation and engagement requirements.

A RAG-based evaluation of the options was undertaken against a set of 25 planning criteria and 62 sub-criteria – See Appendix 5. These criteria were developed on the basis of extant government policy and regulations in 2021, such as Draft National Policy Statement for Water Resources Infrastructure (Nov. 2018), National Planning Policy Framework (2021), the Environmental Impact Assessment Regulations (2017) and so on.

The criteria considered within the scope of the consenting risk review process set out in this section were identified at the scoping stage through a structured approach based on SME qualitative judgement. As well as changes in the legal and policy context, the SMEs also considered developments in the broader planning context, and changes associated with the design and development of the SO as described in Section 5. Through this process, 15 of the 25 evaluation criteria considered at Gate 2 were identified as subject to potentially material changes that warranted review - see Table 5 and Table 6 in the scoping section above.

6.2. Approach

For the consenting risk review itself, a qualitative SME-based assessment was carried out for the SO and BUO against the fifteen in-scope consenting risk criteria. A summary of the approach is set out below.

Firstly, appropriate SMEs were identified to consider the consenting risks associated with each of the in-scope criteria. The SMEs comprised both SWS technical experts and their HWTWRP advisors.

The SMEs were asked to consider the changes identified at the scoping stage in relation to the 15 in-scope assessment criteria and whether the RAG ratings given to Option B.4 and B.5 in the OAP consenting evaluation remained valid or should be changed. They were initially asked to provide provisional updated RAG scores and concise explanations of the reasoning for their judgments using a spreadsheet-based template. To assist in this process, they were provided with the following information:

- Details of the criteria and sub-criteria and RAG scores for Options B.4 and B.5 given at Gate 2, along with the narrative justification for the scores that were given.
- The narrative provided by evaluators when the consenting risk evaluation was reviewed to take account of the evolution of the options following the Future Needs Assessment;
- Scoring guidance, which was the same as that used in the OAP consenting evaluation at Gate 2, as shown in Table 8.

Table 8: RAG scoring scheme used in Gate 2 consenting evaluation

Score	Definition
Substantial adverse	Potential for substantial consenting risks that are likely to be very challenging to overcome / mitigate. Impacts are likely to be unacceptable and will fail to meet required legal/policy tests based on current information.
Large adverse	Potential for major consenting risks. Impacts are likely to require significant mitigation but are potentially acceptable from legal / policy perspective. A case may need to be made e.g., balance of benefits against impacts but could be justified.
Moderate adverse	Potential for moderate consenting risks that will require the development of bespoke mitigation to address, but likely to be achievable and acceptable in policy terms i.e. policy compliance can be achieved.
Minor adverse	Potential for minor consenting risks that will require application of standard best practice.
Positive Impact	Potential for positive performance against policy.
No impact	Does not require appraisal and can be scoped out as not relevant to the Option e.g., no receptors within policy wording that could be affected.

Once the provisional updated RAG scores and justifications had been collated, a workshop was held to discuss them and agree any changes that were necessary to ensure the overall approach was consistent and robust. This was held on 25th October 2025, with a second session to finalise a number of outstanding issues held on 11th December 2025. The workshop and follow-up session were attended by the SMEs, as well as the client working group, comprising senior SWS staff and their legal and technical advisors.

6.3. Review findings

The Gate 2 and updated consenting evaluation RAG ratings for each of the in-scope criteria, for both the SO and BUO, are shown in Table 9, along with a summary of the justification for the updated RAG ratings. Separate construction-related and operations-related RAG ratings are given for each sub-criterion (apart from whole life cost and whole life carbon, for which a single RAG rating for construction and operations was provided).

The Gate 2 scores for all criteria, including those that were deemed to be out-of-scope of the OAP review are shown in Appendix 5.

Table 9: Summary of consenting risk review findings

Assessment Criteria			Activity	Gate 2 OAP RAG rating		Updated RAG rating		Summary narrative
No.	Criterion	Sub-criteria		SO (Evolved Option B.4)	BUO (Evolved Option B.5)	SO (HWTWRP)	BUO (Evolved Option B.5)	
2	Biodiversity & Nature Conservation Terrestrial - HRA	<ul style="list-style-type: none"> SAC, SPA, Ramsar sites & all potential, possible & candidate sites Functionally linked habitat 	Construction	Large adverse impact	Large adverse impact	Large adverse impact	Large adverse impact	While a number of impact pathways have been avoided and minimised, the loss of the SWBGS site at the WRP is nonetheless a likely significant effect during the construction phase that requires substantial mitigation to reduce it to a non-significant level. Separate risks applicable to the BUO only were not considered.
			Operations	Moderate adverse impact	Moderate adverse impact	Minor adverse impact	Minor adverse impact	Operational effects on functionally linked land have been reduced to Minor Adverse Impact. The only FLL relevant to the Proposed Development are the SWBGS sites. The only location where operational impacts are likely is at Budds Farm WTW, where the birds are already habituated to the disturbance levels and the proposed development will not alter those substantively from the current baseline. Separate risks that apply to the BUO only were not considered.
3	Biodiversity & Nature Conservation - Terrestrial	<ul style="list-style-type: none"> Nationally designated sites Impact on priority habitats Ancient woodland & veteran trees 	Construction	Large adverse impact	Large adverse impact	Large adverse impact	Large adverse impact	Large Adverse Impact considered to remain for both options on the basis that while the project avoids the loss or deterioration of Ancient Woodland and veteran trees, mitigation is still required for designated sites. Potential risks to SSSI sites, requiring significant mitigation, remain. Open mosaic habitat at the WRP was unknown at Gate 2 and requires more mitigation than previously expected, which elevates a consenting risk.
			Operations	Minor adverse impact	Large adverse impact	Minor adverse impact	Large adverse impact	The SO was considered to have a Minor Adverse Impact. The BUO was considered to have a Large Adverse Impact owing to risks to the River Itchen SSSI as a result of the EBL. These would require the development of mitigation (as noted in the terrestrial HRA section of the Gate 2 consenting evaluation). For this reason, the level of consenting risk continues to be assessed as major.
4	Biodiversity & Nature Conservation – Marine - HRA	<ul style="list-style-type: none"> SAC, SPA, Ramsar sites & all potential, possible & candidate sites Functionally linked habitat 	Construction	Moderate adverse impact	Moderate adverse impact	Minor adverse impact	Minor adverse impact	The RAG rating was lowered for both the SO and BUO from Moderate to Minor Adverse Impact for construction. The use of current construction methods for the pipeline between Budds Farm and the WRP would result in no / limited disturbance to the seabed and therefore no/limited sediment suspension and risk of smothering of intertidal and subtidal habitats. Whilst the SUDS outfall will involve construction in the marine environment, the disturbance to the seabed is considered minor, and the risk of increased suspended sediments and smothering is considered negligible, with the current draft construction methods.
			Operations	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Operation of the WRP and discharge to the Eastney LSO would remain the same, therefore the consenting risk is considered to remain as Moderate Adverse Impact for both the SO and BUO.
5	Biodiversity & Nature Conservation – Marine	<ul style="list-style-type: none"> Nationally designated sites Impact on priority habitats 	Construction	Moderate adverse impact	Moderate adverse impact	Minor adverse impact	Minor adverse impact	For both the SO and BUO, the use of current construction methods for the pipeline between Budds Farm and the WRP would result in no / limited disturbance to the seabed and therefore no / limited sediment suspension and risk of smothering of intertidal and subtidal habitats. Whilst the SUDS outfall will involve construction in the marine environment, the disturbance to the seabed is considered minor and the risk of increased suspended sediments and smothering is considered negligible with the current draft construction methods.
			Operations	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	For the SO and BUO, operation of the WRP and discharge to the Eastney LSO would remain the same, therefore the risk remains as Moderate Adverse Impact.
6	Carbon	<ul style="list-style-type: none"> Embodied carbon Carbon emissions (operations) 	Whole life (Construction & Operations)	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Whole life carbon was assessed as Moderate Adverse Impact for the SO and BUO, on the basis there is still a moderate consenting risk. The emissions to be reported in the ES for the SO are higher than estimated through modelling at Gate 2 for this Option. Note that the emissions can't be directly compared with the Gate 2 estimates as the mean (average) and maximum flows for the SO, as presented in the ES and DCO, are higher than was assumed at the Gate 2 evaluation stage. Estimated carbon emissions remain consistent with the NPSWRI requirements, and the UK's trajectory towards Net Zero, notwithstanding the updated ISEP guidance from 2022 and the implications of the Finch case (In relation to the latter, the scope of the assessment is considered to be unaffected). SWS is committed to achieving Net Zero by 2050, approximately year 16 of the assumed 100-year design life of the infrastructure. A high-level assessment was undertaken for the BUO (for which no design development has been undertaken since Gate 2). This assessed what the BUO carbon impact would be with the benefit of incorporating learning from development of the SO and insight from other SRO projects, where relevant.

Assessment Criteria			Activity	Gate 2 OAP RAG rating		Updated RAG rating		Summary narrative
No.	Criterion	Sub-criteria		SO (Evolved Option B.4)	BUO (Evolved Option B.5)	SO (HWTWRP)	BUO (Evolved Option B.5)	
								The whole life carbon for the BUO was estimated to be approximately 19% higher than for the SO. This shows the SO remains a lower carbon solution than the BUO.
8	Geology & soils	<ul style="list-style-type: none"> Designated sites Soil resource Risk of mobilisation of contaminants 	Construction	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	SO and BUO were both considered to remain at Moderate Adverse Impact during construction. There is a risk of mobilising contamination, but this will be managed through bespoke mitigation. The ES concludes that there will be no residual significant effect. In terms of soil resource, it should be noted that survey data collected after 2021 Gate 2 Optioneering confirmed the WRP site is not agricultural land. However, it was considered that if all sub-criteria are taken together, the overall consenting risk remains Moderate Adverse.
			Operations	No impact	No impact	No impact	No impact	
9	Historic environment - Terrestrial	<ul style="list-style-type: none"> Nationally & regionally important assets Unknown archaeology (impact on areas of archaeological potential) 	Construction	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	<p>For the SO, the Moderate Adverse Impact was considered to remain appropriate. While the route no longer goes through Staunton Country Park, development of bespoke mitigation is required (Outline Written Scheme of Investigation to be submitted with the DCO application). It should be noted that the WWII crash site was not a receptor that would have been considered within the Gate 2 consenting risk evaluation, so it was not treated as a comparator between options. (Other routes have not been considered in sufficient detail to identify whether similar sites appear elsewhere). The WWII crash site will require consenting through the PoMRA process, to be sought outside the DCO.</p> <p>For the BUO, the Moderate Adverse Impact was also considered to remain appropriate. While the BUO does not include the HTR-WRP pipelines, it comprises the same WRP-Otterbourne pipeline together with the addition of new pipeline to connect Peel Common to the WRP. More pipeline construction would be expected to increase the potential for adverse effects. This potential route corridor contains a number of designated heritage assets, including the Scheduled Portsdown forts that are directly adjacent to the Peel Common pipeline along Portsdown Hill Road, Funtley Ironworks and Titchfield Abbey and Fishponds, which are close to the route. The route passes through water meadows that are likely to hold high levels of significance for geoarchaeology and paleoenvironmental interest as well as being valued historic landscape types. It is also likely that this route passes through significant but non-designated parkland and through an area of very high potential for 19th and 20th century military features that are related to the landward defence of Gosport. Subsequent geoarchaeological work has also flagged the survival of very important palaeolithic deposits on the southern base of Portsdown Hill that would present a constraint to tunnelling. Effects on the WRP-Otterbourne pipeline would be broadly equivalent to those presented by the SO.</p>
			Operations	Minor adverse impact	Minor adverse impact	Minor adverse impact	Minor adverse impact	Minor Adverse Impact as SO and BUO do not provide positive performance against policy.
11	Landscape / Seascape and Townscape and Visual Amenity	<ul style="list-style-type: none"> Nationally & regionally important assets Visual amenity 	Construction	Large adverse impact	Large adverse impact	Moderate adverse impact	Moderate adverse impact	<p>Since 2021, the Levelling Up and Regeneration Act 2023 has strengthened the duty on relevant authorities such that they must 'seek to further the purposes' of Protected Landscapes and the Project may compromise the ability to do so during construction on a temporary basis. Notwithstanding this, contextual change, the RAG rating was reduced to Moderate Adverse Impact for both the SO and BUO (latter agreed at the workshop). The SO no longer goes through the SDNP, although it does fall within its setting and passes in proximity with viewpoints in the SDNP predicted to experience significant effects during the construction of the Project. The HWTWRP scheme is a betterment compared to the Option B.4 scheme in 2021.</p> <p>In the case of the BUO, there are potential setting impacts on SDNP (owing to the EBL, as well as AGPs) but the option avoids nationally and regionally important assets.</p>
			Operations	Minor adverse impact	Moderate adverse impact	Minor adverse impact	Moderate adverse impact	<p>There was no change to Minor Adverse Impact for the SO as mitigation would be established by Year 15.</p> <p>For the BUO, there was no change to Moderate Adverse Impact since, while mitigation would be established by Year 15, visual impacts on SDNP / other receptors during operation may be worse than with the SO owing to the visual impact of the EBL. While the location of the EBL was unknown, it has the potential to have a greater level of visual impact, particularly if in close proximity to SDNP (e.g. if at / near Otterbourne).</p>
14	Resource & waste management	<ul style="list-style-type: none"> Waste generation 	Construction	Minor adverse impact	Minor adverse impact	Minor adverse impact	Minor adverse impact	No change from Minor Adverse Impact for both the SO and BUO. For the purposes of waste generation, and waste facilities and infrastructure, the scheme has no direct impact on the safeguarded listed assets.

Assessment Criteria			Activity	Gate 2 OAP RAG rating		Updated RAG rating		Summary narrative
No.	Criterion	Sub-criteria		SO (Evolved Option B.4)	BUO (Evolved Option B.5)	SO (HWTWRP)	BUO (Evolved Option B.5)	
		<ul style="list-style-type: none"> Waste facilities / infrastructure 	Operations					However, it does generate a volume of hazardous waste from both the WRP and pipeline construction which in EIA terms is classified as a 'significant effect'.
		<ul style="list-style-type: none"> Impact on Mineral Safeguarding Areas Proximity to licensed dredging, disposal and extraction areas 		No impact	No impact	No impact	No impact	For minerals, Hampshire CC published a 'partial' update in 2021 which may have not been factored into the original optioneering, though 2013 is the 'adopted plan'. The assessment of effects on minerals in the EIA concludes 'no significant effect' following adoption of relevant mitigation measures. A similar result would be expected for the BUO.
16	Traffic & transport	<ul style="list-style-type: none"> Impact on shipping and navigation Impact on marine vessel users Impact on road and rail network Impact on road users 	Construction	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Large adverse impact	For the SO, a Moderate Adverse Impact remains appropriate for the impact on road users For the BUO, a substantial increase in consenting risk was identified as the EBL could be up to 10x larger than anticipated at Gate 2. To reflect this chance, the RAG rating was increased to 'Large Adverse Impact'. This represents a substantial increase in impacts on road users that are likely to require significant mitigation.
			Operations	Minor adverse impact	Minor adverse impact	Minor adverse impact	Minor adverse impact	No change to status of Minor Adverse Impact for both the SO and BUO.
18	Flood risk	<ul style="list-style-type: none"> Impact on flood risk Impact on flood defences 	Construction	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	No change to the status of Moderate Adverse Impact for the SO. A preliminary Flood Risk Assessment has been completed for the pipeline route. The pipeline crosses areas designated as Flood Zones 2 and 3; however, trenchless construction methods are being employed beneath main rivers to avoid interference with flood zones. Some ordinary watercourses will be crossed using open-cut construction techniques. Temporary flume pipes will be installed to maintain flow, allowing trench excavation beneath the channel. Following the September 2025 update to the PPG, Flood Risk Assessments must now consider all sources of flooding and apply climate change allowances over the lifetime of the development. If the proposed pipeline remains entirely subsurface and the permanent above-ground infrastructure is located within Flood Zone 1 and at low risk from all sources of flooding, these changes do not materially affect the consenting risk for the scheme. The same considerations apply to the BUO, with the additional proviso that the location of the EBL would need to avoid areas at risk of flooding from all sources.
			Operations	No impact	No impact	No impact	Minor adverse impact	Detailed Flood Risk Assessments have been produced for each permanent above-ground infrastructure asset. All permanent above-ground infrastructure is located within Flood Zone 1. Sustainable Drainage Systems (SuDS) have been incorporated into the surface water management plan to mitigate surface water flood risk at these sites. There will be no change to the impact if all permanent above-ground infrastructure is sited in Flood Zone 1. There will be no change to the impact if the pipeline remains subsurface. Climate change has been considered in each Flood Risk Assessment and would be considered for other options. Some uncertainty in relation to flood risk for the BUO was identified. In particular, above ground assets on the Peel Common - WRP pipeline and the EBL could be sited in or near Flood Zone Areas 2 & 3 that could require mitigation through application of standard best practice. This could include provision of compensatory flood plain storage or flood defence mitigation.
19	Interface with Future Development & Planning	<ul style="list-style-type: none"> Risks assoc. with existing / future NSIPs Risks associated with 'other' development Risks associated with compromising future marine development 	Construction	Moderate adverse impact	Moderate adverse impact	Minor adverse impact	Moderate adverse impact	Risks associated with exiting / future NSIPs: The route of the SO and BUO continues to intersect with the boundary of the Southampton to London Pipeline DCO however it is understood that this latter project has been developed. The SO has been designed to consider the interface with the pipeline, to provide flexibility during the construction phase. The SO also continues to intersect with the boundary of the AQUIND interconnector; however, the Project will be tunnelled in this location and therefore no actual intersection with this project is expected. Risks associated with 'other' development: The SO has been designed to avoid and reduce interface with proposed developments, including the following common elements of the SO and BUO: the development of 2,550 dwellings west of Waterlooville (10 / 02862 / OUT), the upgrading of the recreation ground in Swanmore (17 / 01300 / FUL), and the Solar Farm south of Bishop's Waltham (21 / 01391 / FUL). The SO is located adjacent to the Welborne Garden Village site which is currently being developed and is expected to remain under development when the Project is being developed. There is potential for interfaces between the SO and access works and landscaping associated with Welborne. The Project has been designed to provide flexibility in these locations. The SO interfaces with an approved solar development to the north of Titchfield Lane (24/02804/FUL). It is understood that Winchester City Council

Assessment Criteria			Activity	Gate 2 OAP RAG rating		Updated RAG rating		Summary narrative
No.	Criterion	Sub-criteria		SO (Evolved Option B.4)	BUO (Evolved Option B.5)	SO (HWTWRP)	BUO (Evolved Option B.5)	
								<p>have raised this with the developer, and the developer has submitted details showing how the solar development could be amended to accommodate the Project. The Project is aware that a number of landowners are proposing residential development on land that is intersected by the SO. These developments do not, however, have planning permission, a live planning application or an allocation in an adopted or emerging local plan. The Project is also aware of the intention for land at Five Oaks Farm to be developed as a quarry. The Project has engaged with the landowner and provided flexibility in the Order Limits to reduce effects on the quarry development should it come forward.</p> <p>The following additional risks for the BUO were identified: The pipeline between Peel Common WSW and WRP would intersect with the Stubbington Bypass (B3334) which has been developed since the Gate 2 OAP. This pipeline would also intersect new residential development to the west of Funtley which has been developed since the Gate 2 OAP.</p> <p>Risks associated with compromising future marine development: No risks associated with compromising future marine development were identified for the SO or BUO.</p> <p>Development plan risk: The SO has been designed to avoid all development allocations in adopted and emerging local plans. Portsmouth City Council is currently developing a local plan that includes a new local green space allocation on land where one of the Above Ground Plant sites common to the SO and BUO is located. The Project is currently engaging with Portsmouth City Council to remove the AGP site from the local green space allocation. The site for the WRP is located on land that is allocated for employment use in Havant Borough Council's local plan. The Project is currently engaging with Havant Borough Council, and it is expected this allocation will be removed in HBC's updated local plan.</p>
			Operations	No impact	No impact	No impact	No impact	
23	Constructability	<ul style="list-style-type: none"> Construction risks Construction timescales Interfaces with utilities 	Construction	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	<p>For the SO, there is a construction risk associated with the interface with PW's Havant Thicket reservoir, which Portsmouth Water is responsible for delivering (inlet pipe connection and complicated pipe jack under the A27). The BUO does not interface with Havant Thicket reservoir and therefore avoids this risk. However, there is additional construction risk for the BUO associated with the additional transfer via a 25km pipeline and the need for a (~800ML) EBL, neither of which are needed for the SO.</p>
24	Resilience	<ul style="list-style-type: none"> Likely resilience of the solution Self-sufficiency of the solution 	Operations	Minor adverse impact	Minor adverse impact	Minor adverse impact	Minor adverse impact	<p>There were no material changes in the methodology SWS uses to assess resilience, and the Gate 2 RAG ratings were considered to remain appropriate. Nevertheless, it should be noted that the SO is considered objectively to be more resilient than the BUO. The reason is that the resilience methodology doesn't take account of the complexity of providing the raw water. In the case of the SO, this is simpler owing to the interface with HTR, which has the benefit of the large water storage facility providing seven days of supply if the WRP failed.</p>
25	Cost	<ul style="list-style-type: none"> Capital cost Operational cost 	Whole life (Construction & Operations)	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact	Large adverse impact	<p>For the SO, the RAG rating was assessed as remaining at Moderate Adverse Impact, since design is only developed to circa 10 - 15% maturity and key areas such as land, environment and heritage are still to be finalised. The NPV of the SO is currently £1,886m.</p> <p>A high-level cost assessment was undertaken for the BUO. It was recognised that the BUO cost assessment would be informed by learning from the development of the SO, as well as insight from other SRO projects where relevant. The NPV of the BUO is £2,644m. This shows that the BUO remains a higher cost option than the SO. Whilst this is not a risk for consenting, the NPS does ask scheme promoters to consider best value for customers. It would therefore be necessary to demonstrate how such a higher cost solution represented best value. It was agreed at the consenting risk workshop to change the RAG rating from Moderate Adverse Impact to Large Adverse Impact.</p>

6.4. Summary and Commentary

A summary comparison of the Gate 2 and updated RAG ratings is shown in Table 10.¹⁷

Table 10: SO and BUO RAG ratings at Gate 2 and OAP review, with changes

Activity	RAG ratings	SO		BUO		Change	
		Gate 2	OAP review	Gate 2	OAP review	SO	BUO
Construction	Large Adverse	3	2	3	4	-1	+1
	Moderate Adverse	10	8	10	7	-2	-3
	Minor Adverse	1	4	1	3	+3	+2
Operations	Large Adverse	-	-	1	2	-	+1
	Moderate Adverse	5	4	6	4	-1	-2
	Minor Adverse	5	6	3	5	+1	+2
	No impact	4	4	4	3	-	-1
Total	Large Adverse	3	2	4	6	-1	+2
	Moderate Adverse	15	12	16	11	-3	-5
	Minor Adverse	6	10	4	8	+4	+4
	No impact	4	4	4	3	-	-1

At Gate 2, the SO ranked slightly more highly than the BUO and this gap in performance increased in the OAP review. Compared to the BUO, the SO had:

- One fewer Large Adverse Impact at Gate 2 and four fewer in the OAP review
- One fewer Moderate Adverse Impact at Gate 2 and one more in the OAP review
- Two more Minor Adverse Impacts at Gate 2 and two more in the OAP review
- The same number of 'No Impacts' at Gate 2 and one more in the OAP review

Commentary on the RAG ratings at the individual criteria level is set out below:

- For **Biodiversity & Nature Conservation - Terrestrial** (Criterion No. 3), the SO scored a Minor Adverse Impact and the BUO a Large Adverse Impact, at Gate 2. The BUO's poorer performance was driven by the risks to the River Itchen SSSI associated with the EBL, which would require the development of mitigation. These scores were unchanged in the updated evaluation.¹⁸
- Across the four **Biodiversity and Nature Conservation** criteria (Criteria Nos 2,3,4,5), several of the Moderate Adverse Impacts scored at Gate 2 were updated to Minor Adverse Impacts for both the SO and BUO, although there were no changes in the 'Large Adverse Impacts' for either the SO or BUO.
- For **Landscape / Seascape and Townscape and Visual Amenity** (Criterion No. 11), both the SO and BUO were scored as having Large Adverse Impacts associated with construction at Gate 2. Both of these were updated to Moderate Adverse Impact. While the SO no longer directly interfaces with the South Downs National Park (SDNP)¹⁹, both the SO and BUO have significant potential setting impacts for the SDNP requiring mitigation.²⁰

¹⁷ A total of 28 RAG ratings were scored, one each for construction and operations across each of the in-scope criteria, except for constructability and resilience which, respectively, were rated for construction only and operations only. Whole life cost and whole life carbon were given a single RAG rating across construction and operations phases in the evaluation. These were counted as both a construction and operations rating in the summary analysis.

¹⁸ The capacity of the EBL is now assumed to be ten times greater in size than at Gate 2. This suggests the differential between the SO and BUO could have increased further than is apparent from the unchanged RAG scores.

¹⁹ The SO nevertheless falls within the setting of the SDNP and passes in proximity, with viewpoints in the SDNP predicted to experience significant effects during the construction of the Project.

²⁰ The increase in the assumed size of the EBL since Gate 2 may increase the differential impact with the SO more than the RAG ratings suggest.

- The increase in the size of the EBL drove a change in the BUO construction scoring for **Traffic and Transport** (Criterion No. 16), from Moderate Adverse Impact to Large Adverse impact, owing to a substantial increase in impacts on road users that are likely to require significant mitigation.
- There was no change to the RAG status of Moderate Adverse Impact for the SO and BUO on **Flood Risk** during the construction phase. It was however considered appropriate to change the RAG status for the BUO from 'No Impact' to 'Minor Adverse Impact' during the operational phase to reflect uncertainty about whether any above-ground infrastructure would be in Flood Zones 2 and 3 and therefore would require mitigation. On the other hand, following development work on the SO, no above-ground infrastructure is within Flood Zones 2 and 3 and it was considered appropriate to maintain the RAG status as 'No Impact'.
- For **Interface with Future Development & Planning** (Criterion No. 19), both the SO and BUO were scored as Moderate Adverse Impacts at Gate 2. The SO has been designed to reduce or avoid interfaces with other projects, justifying a change in the rating to Minor Adverse Impact. While these design approaches apply to sections of the BUO that are common to both options, they do not currently apply to BUO-only elements. The pipeline between Peel Common WSW and the WRP would intersect with the Stubbington Bypass (B3334) and new residential development to the west of Funtley, both of which have been developed since the Gate 2 OAP.
- For **Whole life cost** (Criterion No. 25), both the SO and BUO were scored as Moderate Adverse Impacts at Gate 2, although the BUO was more costly. The updated estimated present values of cost of the SO and BUO were, respectively, £1,886m and £2,644m (including capex and opex, modelled over an 80-year period). This represented a greater differential than at Gate 2 and the updated RAG ratings reflect this, with the SO retaining its Moderate Adverse Impact score and the BUO scored as Large Adverse Impact.

7 Best Value Appraisal

7.1. Context and Approach

SWS developed its MCDA approach for the Gate 2 OAP over a six-month period in consultation with its regulators and WRSE, testing aspects of the approach and its results with a group of SWS customers.²¹ The evidence and impact assessments that formed the inputs were drawn widely from work undertaken to support the Gate 2 submission to RAPID.

The approach was informed by best practice guidance on the economic appraisal of infrastructure investments against best value, including the definition of a best value plan contained in the WRP, namely one that:

- Considers factors alongside economic cost and seeks to achieve an outcome that increases the overall benefit to customers, the wider environment and overall society;
- Is efficient and affordable to deliver, legally compliant and accounts for the range of legislation that applies to it; and
- Where the outcome of increased benefits will be typically measured relative to the 'least cost' programme that delivers the minimum requirements to meet supply duties.

A comprehensive best value appraisal (MCDA) framework was developed using 23 monetised, quantitative and qualitative criteria grouped into five themes. This enabled a consistent assessment of the relative performance of the options in terms of their NSI and cost / affordability, including extensive testing of the relative rankings of the options using alternative groups of sub-criteria and weightings. A summary of the approach to combining the different impacts within the overall MCDA approach is shown in Figure 4.

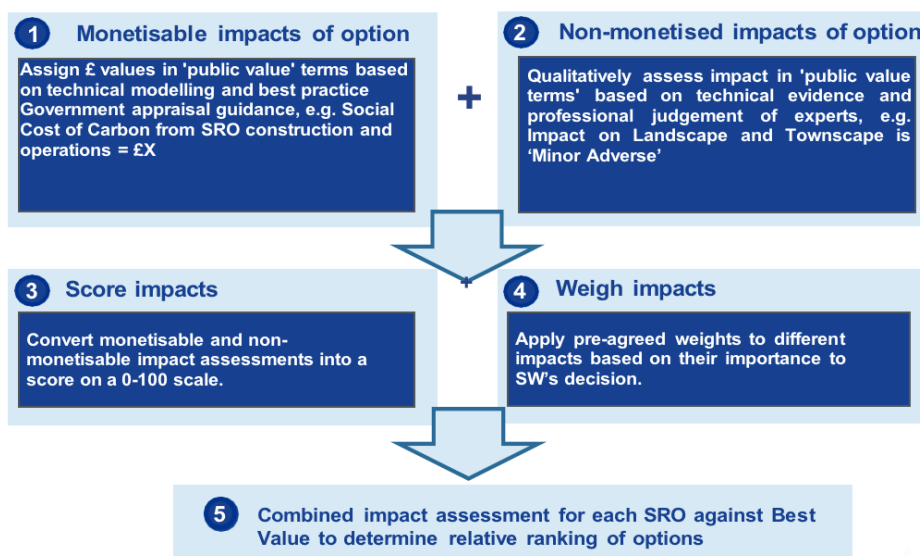


Figure 4: The overall process for combining impacts within the MCDA

The MCDA framework was developed through eight key steps, in line with best practice MCDA guidance from HM Treasury’s Green Book. These are summarised in Table 11, along with the approach to reviewing the framework that has been taken in the OAP review.

²¹ See Gate 2 Submission: Supporting Technical Report Annex 5: Options Appraisal Process – Future Needs Update 6 December 2021

Table 11: MCDA framework with key activities at Gate 2 and OAP review

Activities at Gate 2	OAP review activities
<p>Step 1: Establishing the decision context</p> <ul style="list-style-type: none"> Established aims of the MCDA, identified key decision-makers and stakeholders to the decision (including customers and regulators) Considered the decision context and objective of the appraisal Designed the framework for conducting the MCDA for different infrastructure scheme Options under different operating scenarios 	<ul style="list-style-type: none"> Strategic programme objectives reviewed and updated. Changes in guidance and policy documents considered at scoping stage, with no changes in appraisal requirement identified. Updated project requirement and operating scenario reflecting revised needs identified in WRMP24 – see scoping section. Focus only on reviewing the relative performance of the SO and BUO in line with the agreed scope of the OAP review – see scoping section.
<p>Step 2: Identifying MCDA best value themes / clusters</p> <ul style="list-style-type: none"> Used best practice guidance and considered available evidence to determine key themes for appraisal or ‘cluster criteria’ against which to appraise the Options’ performance 	<ul style="list-style-type: none"> No changes since Gate 2 were identified to warrant changes in the key themes or ‘cluster criteria’.
<p>Step 3: Defining best value sub-criteria</p> <ul style="list-style-type: none"> Identified measurable sub-criteria under each theme for assessing the impacts, or consequences, of each Option, with reference to best practice appraisal approaches and information available at Gate 2 Engaged regulators and WRSE to iterate and finalise the criteria 	<ul style="list-style-type: none"> The sub-criteria were reviewed at the scoping stage. Five of the 23 ‘sub-criteria’ were excluded from the scope of the OAP review. See ‘Scope of updated MCDA’ section below and Table 6 in Scoping section for further details.
<p>Step 4: Assessment of impacts against each sub-criterion and scoring performance levels</p> <ul style="list-style-type: none"> Conducted Gate 2 technical analysis / modelling and evaluation workshops to assess the impacts / consequences of each Option and identify relative performance at the sub-criteria level Scored the raw results of the impact assessments to derive a common assessment of performance across the sub-criteria Checked the consistency of the scores for each sub-criterion 	<ul style="list-style-type: none"> The ‘raw scores’ for the SO and BUO were reassessed, drawing on either existing workstreams supporting the wider DCO submission or new workstreams commissioned specifically to support the OAP review, i.e. to provide updated inputs for the BUO. See ‘Approach to reassessing the impacts’ section below.
<p>Step 5: Defining how to combine the sub-criteria into an overall assessment of best value</p> <ul style="list-style-type: none"> Identified a range of alternative approaches for combining the assessment of the Options’ performance at the sub-criteria level into an overall assessment and ranking against best value, considering (i) different definitions of best value which involve combining an increasing number of different sub-criteria; and (ii) weighting the relative importance of the different sub-criteria under each of these definitions/rankings of best value Engaged regulators, WRSE and SW customers to develop and finalise the weighting scenarios for analysis 	<ul style="list-style-type: none"> An approach to assessing the relative performance of the SO and BUO without the need to reassess the remaining options considered at Gate 2 was developed and agreed with the senior SWS working group. See ‘Approach to reassessing the impacts’ section below.
<p>Step 6: Combining the impact scores and weights to derive an overall assessment of performance</p> <ul style="list-style-type: none"> Calculated overall weighted scores at cluster level using sub-criteria scores and pre-agreed weighting scenarios Combined scores under a number of best value Rankings using unweighted and weighted results 	<ul style="list-style-type: none"> The SO and BUO were reassessed using the same best value rankings and weightings as in the Gate 2 MCDA, and the updated results were compared with the Gate 2 results. See ‘Core results’ sections below.
<p>Step 7: Quality assurance and examination of results</p> <ul style="list-style-type: none"> Conducted quality assurance on both the impact assessments forming inputs to the MCDA and the MCDA calculations 	<ul style="list-style-type: none"> A senior technical review of the impact assessments and MCDA calculations was undertaken; Draft results issued to SWS senior working group on January 9th, 2026;

Activities at Gate 2	OAP review activities
<ul style="list-style-type: none"> Presented draft and final results on relative performance of the Options to SW decision-makers and regulators 	<ul style="list-style-type: none"> Workshops were held on 2nd and 9th March, 2026 with the SWS senior working group to review the MCDA approach and results.
<p>Step 8: Sensitivity analysis</p> <ul style="list-style-type: none"> Conducted switching value analysis to understand what alternative assumptions would need to be made in relation to Option costs and criteria weightings in order to alter the ranking of Options 	<ul style="list-style-type: none"> Sensitivity analysis was undertaken to replicate the approach taken at Gate 2, where appropriate, and to explore specific aspects of uncertainty in the OAP review analysis relating to updating the MCDA inputs for the BUO. See 'Sensitivity analysis' section.

7.2. Scope of updated MCDA

The original MCDA framework assessed each option against 23 sub-criteria grouped into five 'cluster criteria' or themes, as shown in Figure 5. Five sub-criteria were not reported in the MCDA results at Gate 2 as they showed no meaningful differentiation across the options at that stage. The sub-criteria were considered at the scoping stage, resulting in the same five sub-criteria being excluded from the scope of the OAP review, i.e. since they showed no meaningful differentiation between options. These were:

- E.05: Air quality – pollutant removal
- E.09: Exposure to noise
- E.10: Air quality – infrastructure operations
- E.11: Environmental water quality
- S.03: historic Environment – Marine

Details of the updated MCDA scoping framework are set out in Table 6 in the scoping section. The 18 in-scope MCDA sub-criteria, along with the five 'cluster criteria' or themes are shown in Figure 5.

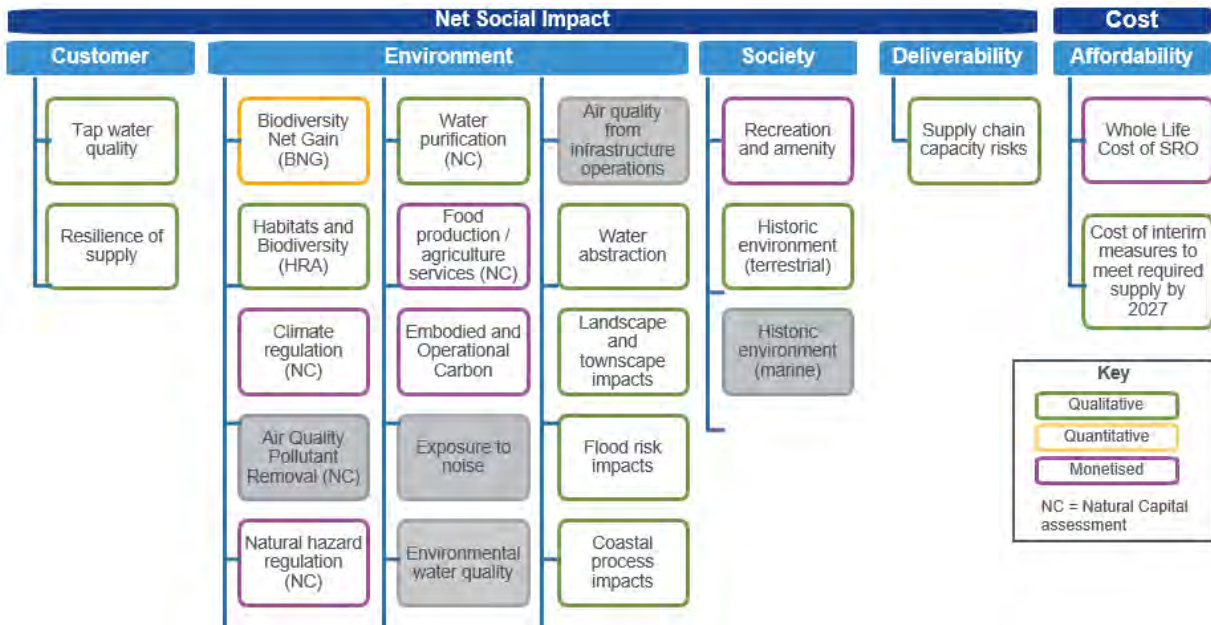


Figure 5: In-scope and out-of-scope MCDA criteria

7.3. Approach to reassessing the impacts

The SO and BUO scoring for the in-scope sub-criteria was updated using, as far as possible, the same analytical approaches used at Gate 2, whilst remaining proportionate to the scope and purpose of the OAP review. Updated MCDA inputs were sourced, where possible, through existing workstreams supporting the wider DCO submission. Where this was not possible, bespoke workstreams were initiated by SWS to provide the specific inputs required for the OAP review.

A summary of the various approaches taken to updating the SO and BUO scoring for the different sub-criteria is set out below, with further practical details provided in Appendix 6.

Monetised and quantified impacts

Whole life cost and whole life carbon

Monetised impact estimates for both the SO and BUO were inputted to the updated MCDA for:

- A.01: Whole life cost;
- E.08: Whole life carbon

Updated whole life cost and whole life carbon estimates for the SO were sourced from the relevant workstreams that informed the Gate 3a cost reporting milestone submission, while comparable estimates were commissioned separately for the BUO from the CIT and Carbon team using the same methodologies but at a proportionate level of detail. Breakdowns of the updated estimates are set out in Appendices 7A (capital costs), 7B (operating costs), 7C (embodied carbon) and 7D (operational carbon).

Biodiversity Net Gain

The following sub-criterion was assessed quantitatively at Gate 2:

- E.01: Biodiversity Net Gain (BNG)

It was not however possible to quantitatively estimate the changes in hectareage by habitat type necessary to inform an updated estimate of BNG units for the BUO using Defra's Biodiversity Metric Toolkit which was employed at Gate 2. The nature of BNG assessment means it is highly sensitive to changes in land use for particular habitat types, and therefore highly context specific. Furthermore, the approach used in the DCO workstream on BNG was not consistent with the Gate 2 approach, which meant comparable updated estimates were not available for the SO.

It was not considered proportionate to undertake a technical BNG assessment for the BUO solely for the purposes of the OAP review. It was therefore agreed that the Gate 2 estimates of BNG units for both the SO and BUO would be used in the updated MCDA.

Partial updates for other monetised criteria

Owing to information limitations it was only possible to partially update the inputs for the following sub-criteria:

- E.03: Climate regulation (NC)
- E.04: Natural Hazard regulation (NC)
- E.07: Food production (NC)
- S.01: Recreation & amenity

At Gate 2, three of the above sub-criteria were based on monetised valuations of changes in natural capital services (NC), as indicated. These depended on an assessment of the expected change in land use resulting from the construction of the options, i.e., hectareage, for various habitat types. The specific habitat types vary according to the sub-criterion, but all are subsets of the habitat types considered in the BNG assessment and, as such, depend on information about hectareage changes from the BNG assessment. In the absence of an

updated BNG assessment for the BUO (see above), it was not possible to source appropriate data or assumptions about hectare changes to inform the updated scores for these criteria in the OAP review. The inputs were partially updated, as follows:

- The Gate 2 methodology would be retained, along with the hectare changes used at Gate 2; and
- The price base, along with all relevant external parameters and values provided through guidance, would be updated, where appropriate, e.g., carbon sequestration rates, carbon values, etc.

A similar issue faced the recreation & amenity sub-criterion, however rather than change in land area by habitat type, the information gap related to effects on public footpaths, i.e. a sensitive receptor. A similar approach was adopted, with the Gate 2 methodology and data on sensitive parameters retained with updated external parameters and values.

The additional uncertainty caused by the data limitations for the BUO in relation to the four sub-criteria discussed above, and the potential effects on the conclusions of the updated MCDA, were considered through sensitivity testing (see section 7.5 below).

Qualitative impacts

A number of qualitative assessments were undertaken specifically for the OAP review, covering:

- C.01: Tap water quality
- C.02: Resilience of Supply;
- E.12: Water abstraction;
- D.01: Supply chain capacity;
- A.03: Cost of interim measures;
- E.06: Water purification services (NC);
- E.13: Landscape & Townscape;
- S.02: Historic Environment – Terrestrial;
- E.14: Flood risk impacts
- E.15: Coastal process impacts;
- E.02: Habitats & Biodiversity.

These assessments were conducted through a series of workshops with appropriately qualified SMEs, reflecting the approaches taken at Gate 2. The SO and BUO were considered concurrently, which was appropriate given the emphasis on relative performance. The assessments took account of the methodologies used at Gate 2, along with changes identified through the scoping stage of the work, and other information as appropriate. As far as possible, the latest information was taken account of, although updated option-specific information for BUO-only elements was constrained by the limited development work undertaken on the BUO since Gate 2. (Information about some significant changes in assumptions was available, such as the capacity of the EBL).

7.4. OAP review assessment

This section sets out the results of the core MCDA analysis undertaken in the OAP review. It includes:

- A comparative assessment of the monetised, quantitative and qualitative MCDA sub-criteria, together with the updated and Gate 2 inputs to the MCDA for each ('raw scores');
- The changes in the 'normalised scores', which allow comparison across criteria;
- A core scenario review in which updated best value rankings are considered – these provide alternative lenses for assessing the options using various combinations of sub-criteria, using unweighted scores; and
- A review of alternative weightings in which the best value rankings are tested using a range of alternative weightings for the sub-criteria to test changes in the relative importance of sub-criteria within the five clusters (Customer, Environment, Social, Delivery and Affordability).

Changes to assessment criteria

Descriptions of each sub-criterion together with an overview of the SO and BUO inputs and their relative ranking, both at Gate 2 and in the OAP review MCDA, are shown in Table 12.

Table 12: OAP review of best value appraisal criteria

Theme	MCDA sub-criterion		Type	Description	Gate 2 conclusions	OAP review findings
Customer	C.01	Tap water quality	Qualitative	The taste, smell and appearance of tap water provided by the Option relative to current quality levels received by customers, taking into account the treatment process of each Option and the expected effects this will have on water quality.	Option B.4 scored higher than B.5 due to blending benefits and customer perception advantages: <ul style="list-style-type: none"> B.4 was seen to benefit from extensive blending with spring water in Havant Thicket reservoir, reducing taste and odour risks and improving customer perception. <ul style="list-style-type: none"> B.5 involved indirect recycling with less blending capacity, so perceived risk was higher despite technical compliance 	<ul style="list-style-type: none"> The Gate 2 scoring for the SO and BUO is unchanged. No new water recycling infrastructure has been developed since Gate 2, and there is no evidence of a material shift in public perception regarding recycled water. Blending with spring water means the SO is expected to have lower customer acceptability risks than the BUO owing to taste and odour.
	C.02	Resilience of supply	Qualitative	Effectiveness of the Option in improving system resilience during short-term capacity issues, with system resilience defined as the ability of the system to cope with, and recover from, disruption, and anticipate trends and variability in order to maintain services for people and protect the natural environment.	<ul style="list-style-type: none"> The SO scored better than the BUO: <ul style="list-style-type: none"> The SO benefited from access to two raw water sources and additional buffering capacity via Havant Thicket reservoir, reducing reliance on existing infrastructure and improving system flexibility during short-term capacity issues. The BUO performed similarly to the SO but lacked the same level of buffering provided by a reservoir, making it more dependent on existing network assets. 	<ul style="list-style-type: none"> The Gate 2 scoring for the SO and BUO is unchanged. The BUO was seen as less resilient than the SO as it has a greater dependence on process operations and absence of reservoir storage, making it less resilient to short-term disruptions or process failures than the SO.
Environment	E.01	Biodiversity Net Gain (BNG)	Quantitative	The potential for net gain in biodiversity alongside the Option's construction, given the Environment Bill requirement to achieve a 10% BNG. Raw scores reflect 'habitat' units from Defra's biodiversity metric tool 3.0.	<ul style="list-style-type: none"> The BNG assessment was conducted using Defra / NE's Biodiversity 3.0 Metric Tool (as recommended by WRP) and assumed a 10% uplift on the baseline level of biodiversity (i.e., the level prior to the introduction of the Option). The changes in hectares of relevant habitat types for the BUO generated a higher number of BNG units than those for the SO, and consequently the BUO scored higher. 	<ul style="list-style-type: none"> It was not possible to source appropriate data or assumptions on changes in hectareage of the various habitat types for the BUO, and, for the SO, the Gate 2 and updated BNG estimates are not comparable. As a result, the Gate 2 inputs for both the SO and BUO were carried forward. Sensitivity testing was carried out to test the impacts of the additional uncertainty associated with this approach – see Section 7.4.
	E.02	Habitats & Biodiversity (HRA)	Qualitative	Effects on marine and terrestrial habitats according to the outputs of Habitat Regulation Assessment.	<ul style="list-style-type: none"> The SO scored higher than the BUO due to a lower consenting risk for habitats and biodiversity: The SO avoided the need for a new EBL, reducing risks to designated habitats. While construction posed risks to SACs from vehicle movements and required multiple watercourse crossings, these were considered manageable with further survey and mitigation. The BUO had additional consenting risk associated with the EBL, through risks to the River Itchen SAC, including potential sediment mobilisation and impacts from emergency discharges, requiring more complex mitigation. 	<ul style="list-style-type: none"> The results of the consenting risk review showed a reduction in effects linked to operations for both options – see Table 9. It was concluded that the SO continues to outperform the BUO, and that the Gate 2 scoring should remain unchanged.
	E.03	Climate regulation (NC)	Monetised	Overall change in natural carbon sequestration (capture and storage of carbon) due to changes in habitat ha, types and condition from the Option's construction, followed by 10% BNG (onsite and offsite impacts).	<ul style="list-style-type: none"> Changes in habitat types associated with the SO generated significantly more climate regulation benefits than the BUO at Gate 2, reflected in a higher monetised score. 	<ul style="list-style-type: none"> It was not possible to source appropriate data or assumptions on changes in hectareage by habitat type, so the inputs used at Gate 2 were applied in the OAP review, along with updated external values and parameters. This had differential impacts owing to the different combinations of habitat types affected in the two options, resulting in the SO outperforming the BUO by a greater margin than at Gate 2. Sensitivity testing was carried out to address the additional uncertainty associated with the limitations of the approach – see Section 7.4.
	E.04	Natural Hazard Regulation (NC)	Monetised	Overall change in natural flood risk management due to changes in habitat ha, types and condition from the Option's construction, followed by 10% BNG (onsite and offsite impacts).	<ul style="list-style-type: none"> Changes in habitat types associated with the BUO generated significantly more natural hazard regulation benefits than the SO at Gate 2, reflected in a higher monetised score. 	<ul style="list-style-type: none"> It was not possible to source appropriate data or assumptions on changes in hectareage by habitat type, so the inputs used at Gate 2 were applied in the OAP review, along with updated external values and parameters. This had differential impacts owing to the different combinations of habitat types affected in the two options, resulting in the BUO outperforming the SO by a slightly increased margin than at Gate 2. Sensitivity testing was carried out to address the additional uncertainty associated with the limitations of the approach – see Section 7.4.
	E.07	Food production / agriculture services (NC)	Monetised	Overall change in the area of land used for food production/agriculture services from the Option's construction, assuming a 10% BNG (onsite and offsite impacts).	<ul style="list-style-type: none"> Both the SO and BUO are associated with a loss of arable land and consequently had negative monetised impacts at Gate 2. The reduction identified at Gate 2 was significantly greater for the BUO than the SO, resulting in the SO performing better. 	<ul style="list-style-type: none"> It was not possible to source appropriate data or assumptions on changes in hectareage by habitat type, so the inputs used at Gate 2 were applied, along with updated external values and parameters. Changes in guidance on the value of arable land resulted in the monetised impacts for both the SO and BUO decreasing significantly since Gate 2. Since the change in hectareage assessed in this sub-criterion relates to a single habitat type, there is no change in the relative performance of the SO and BUO since Gate 2, i.e., the SO continues to outperform the BUO as a significantly smaller area of arable land is lost in the SO. Sensitivity testing was carried out to address the additional uncertainty associated with the limitations of the approach – see Section 7.4.
	E.06	Water purification (NC)	Qualitative	Permanent change in natural water purification services provided by the natural habitat, due to changes in habitat ha, types and condition from the Option's construction.	<ul style="list-style-type: none"> Impacts were scored qualitatively by considering the habitats in which key project components were sited and the expected impact of construction and operation on water purification NC services. At Gate 2 the BUO had fewer adverse impacts than the SO and consequently scored better. 	<ul style="list-style-type: none"> The SO and BUO scored similarly based on known scheme components but uncertainty about the location of BUO components in relation to the Peel Common to WRP site and EBL meant there was some uncertainty about localised impacts. It was therefore deemed prudent to retain the Gate 2 scores, with the BUO slightly outperforming the SO.

Theme	MCDA sub-criterion		Type	Description	Gate 2 conclusions	OAP review findings
	E.08	Embodied and operational carbon	Monetised	Overall change in carbon emissions from both the embodied carbon associated with construction of the Option infrastructure and operational carbon emissions associated the Option's operating regime.	<ul style="list-style-type: none"> A monetised carbon assessment was undertaken by Motts. The whole life carbon impact of the BUO was assessed to be substantially higher than that of the SO. 	<ul style="list-style-type: none"> The monetised carbon impacts of both the SO and BUO were much higher in absolute terms than at Gate 2 owing to a combination of significant changes in carbon values since Gate 2, changes in project requirements / operating scenario and developments in scheme design. The SO continues to outperform the BUO by a wide margin.
	E.12	Water abstraction	Qualitative	Removal of water resources (ground or surface water) at identified sites as a result of the Option, considering both the direct abstraction required by the Option's operation and the effects on baseline abstraction required by the existing network.	<ul style="list-style-type: none"> Option B.4 scored lower than B.5 due to B.5's complete avoidance of new water abstraction: B.4 replaced a small volume of high-value abstraction water with zero-value final effluent, offering some benefit but still involving direct abstraction. B.5 relied entirely on recycling previously abstracted water, resulting in no direct abstraction and minimal environmental impact. Both options reduced reliance on Otterbourne WSW, but the approach for B.5 had a lower abstraction impact. 	<ul style="list-style-type: none"> The Gate 2 conclusions remain unchanged. Both options continue to reduce reliance on the River Itchen. The BUO performs better than the SO, however, as it avoids direct abstraction entirely.
	E.13	Landscape and townscape	Qualitative	Permanent change in the character and visual amenity of local landscapes (including urban) from operation of the Option (after all design work to mitigate / improve the effects of the scheme).	<ul style="list-style-type: none"> Gate 2 inputs were derived from analysis undertaken by Stantec. There were Large Adverse impacts at Gate 2 associated with the impacts on SDNP. The SO and BUO scored equally. 	<ul style="list-style-type: none"> The SO and BUO no longer interface directly with SDNP, though both continue to have impacts on the setting SDNP setting. The anticipated impacts of the BUO are worse than anticipated at Gate 2 because of the significant increase in scale of the EBL.
	E.14	Flood risk	Qualitative	Permanent change in local flood risk due to construction of Option impacting floodplain or other areas, which could pose social costs via harm to people, damage to property and / or harm to the environment.	<ul style="list-style-type: none"> Gate 2 inputs were derived from qualitative analysis undertaken by Stantec, based on consenting risks. The ranking was based on lengths of pipeline within Flood Zone Areas 2 and 3. On this basis, the BUO ranked above the SO. 	<ul style="list-style-type: none"> The pipeline routes on which the Gate 2 scoring was based have changed. Some permanent flood risk impacts from constructing above ground assets in Flood Zone Areas 2 & 3, e.g. pumping stations were noted but there is no significant residual risk associated with this for the SO. Some uncertainty in relation to flood risk for the BUO was identified. In particular, above ground assets on the Peel Common - WRP pipeline and the EBL could be sited in or near Flood Zone Areas 2 & 3. It was therefore agreed that the SO now outperforms the BUO, reversing the ranking at Gate 2.
Social	S.01	Recreation and amenity	Monetised	Overall change in recreation and amenity services due to changes in land area from the Option's construction.	<ul style="list-style-type: none"> Both the SO and BUO had adverse impacts on recreation and amenity through impacts on sensitive receptors (footpaths). The impacts of the SO were significantly greater than those of the BUO. The BUO therefore scored better than the SO at Gate 2, i.e. it had a smaller negative impact. 	<ul style="list-style-type: none"> It was not possible to source appropriate data or assumptions on impacts on sensitive receptors (footpaths), so the inputs used at Gate 2 were applied in the OAP review, along with updated external values and parameters. This did not affect the relative performance of the SO and BUO, with the BUO continuing to outperform the SO. Sensitivity testing was carried out to address the additional uncertainty associated with the limitations of the approach – see Section 7.4.
	S.02	Historic environment (terrestrial)	Qualitative	Permanent change in the character of local terrestrial heritage assets (buildings, public spaces, sites) from operation of the Option (after all design work to improve / mitigate the effects of the scheme).	<ul style="list-style-type: none"> The SO and BUO scored equally due to similar levels of impact and mitigation potential: The SO was expected to require best practice mitigation near Listed Buildings and Scheduled Monuments, with potential indirect effects on settings, particularly along the A2030, though direct impacts could be avoided through design. The BUO faced comparable risks, especially along Portsdown Hill Road, where its physical footprint and infrastructure posed challenges to heritage settings, requiring further assessment and mitigation. 	<ul style="list-style-type: none"> The route of the SO has changed and now avoids key risks identified at Gate 2, notably Stanton Country Park. There are remaining risks associated with elements of the BUO, both in relation to the Peel Common to WRP pipeline and the EBL. As a result, the Gate 2 scoring was updated with the SO ranked higher than the BUO.
Delivery	D.01	Supply chain capacity risks	Qualitative	The extent to which the capacity and skills available in the market to construct the Option infrastructure (considering the technology solution and scale of the project) poses a risk to delivery by in 2027 in line with legal obligations.	<ul style="list-style-type: none"> Option B.4 and B.5 scored equally due to similar supply chain challenges and technology maturity. Both options included well-tested elements such as pipelines, but the WRP introduced moderate delivery risk due to its complexity. 	<ul style="list-style-type: none"> The Gate 2 conclusions remain unchanged, with the SO and BUO scoring the same as one another. The designs of both options have not fundamentally changed since Gate 2, and the associated supply chain risks remain broadly comparable. While the BUO may involve more tunnelling than was assumed at Gate 2, this was not considered significant enough to alter the original scoring.
Affordability	A.01	Whole life cost of SRO infrastructure	Monetised	Financial cost of the Option infrastructure incremental of a 'do-nothing' baseline (CAPEX, OPEX and lifecycle costs) over the life of the project (assumed to be 100 years), which ultimately poses an affordability issue / cost to customers.	<ul style="list-style-type: none"> The SO performed significantly better than the BUO at Gate 2, with Whole life cost estimates of £745m and £1010m respectively. 	<ul style="list-style-type: none"> The cost estimates for the SO and BUO increased substantially, to £1,890m and £2,640m respectively. This represents a ~150% increase for the SO and a ~160% increase for the BUO. The large increases arose from a combination of changes in project requirements and assumed construction methods for pipeline sections, along with the uprating of the price base. The risk-adjusted cost increase was proportionately greater for the BUO owing to uncertainty about the technical feasibility of a 90 MI/d WRP and the required size of the EBL, which could be up to 10 times larger than assumed at Gate 2 (reflected in OB assumption).
	A.03	Cost of interim measures	Qualitative	Qualitative assessment as a proxy of financial cost associated with Option if project does not deliver in 2027 and requires interim measures to deliver capacity in line with legal obligations, which poses an affordability issue / cost to customers. This sub-criterion uses time between s20 deadline and expected delivery of Option to assess impacts.	<ul style="list-style-type: none"> Option B.4 scored higher than B.5 due to a shorter delay to operational readiness and fewer dry seasons requiring interim measures. B.4 was expected to be operational by January 2030, resulting in four full dry seasons requiring interim measures after the S20 deadline. B.5 had a later operational date of October 2030, leading to five full dry seasons of interim measures and higher associated cost risk. 	<ul style="list-style-type: none"> The Gate 2 conclusions remain unchanged. The SO outperforms the BUO, with lower costs of interim measures needed during dry seasons. Recent delays to the Havant Thicket reservoir suggest the BUO's delivery timeline may have been optimistic, as it requires an EBL to be constructed. If this were factored into the scoring, the gap between the options would be expected to widen.

Table 13 shows the criteria values for the SO and BUO at Gate 2 (as reported in the Gate 2 OAP document) and the revised scores used in the core OAP review analysis.

Table 13. MCDA assessment criteria findings

Criteria	Type	Gate 2		OAP review		Commentary
		SO	BUO	SO	BUO	
C.01 Tap quality water	Qual. RAG	100	50	100	50	No change since Gate 2.
C.02 Resilience of supply	Qual. RAG	50	25	50	25	No change since Gate 2.
E.01 Biodiversity Net Gain	BNG units	41	48	41	48	Not re-assessed due to lack of information. See sensitivity testing.
E.02 Habitats & biodiversity	Qual. RAG	75	25	75	25	No change since Gate 2.
E.03 Climate regulation	PV £	£300.6k	£185.6k	£353.1k	£180.4k	Uprated values but inputs not re-assessed owing to lack of information. See sensitivity testing.
E.04 Natural hazard regulation	PV £	£23.2k	£46.7k	£24.5k	£49.4k	As per E.03.
E.06 Water purification	Qual. RAG	-1.4	-1.2	-1.4	-1.2	No change since Gate 2 owing to uncertainty about localised impacts on BUO route.
E.07 Food production	PV £	-£337.8k	-£470.7k	-£181.0k	-£252.3k	As per E.03.
E.08 Embodied and operational carbon	PV £	-£15.5m	-£26.7m	-£109.0m	-£153.9m	Large increase in carbon impacts for SO & BUO. The SO continues to outperform BUO by a large margin.
E.12 Water abstraction	Qual. RAG	50	100	50	100	No change since Gate 2.
E.13 Landscape and townscape	Qual. RAG	75	75	100	75	Change from the SO and BUO scoring equally to the SO outperforming the BUO.
E.14 Flood risk	Qual. RAG	0	100	100	75	Ranking switches, with SO outperforming BUO in OAP review.
E.15 Coastal processes	Qual. RAG	100	100	100	100	No change since Gate 2.
S.01 Recreation and amenity	PV £	-£3.0m	-£2.0m	-£3.2m	-£2.1m	As per E.03.
S.02 Historic env. (terrestrial)	Qual. RAG	0	0	25	0	Change from equal scoring at Gate 2 to SO outperforming BUO, reflecting conclusion of OAP review re-assessment.
D.01 Supply chain capacity risks	Qual. RAG	50	50	50	50	No change since Gate 2.
A.01 Whole life cost	PV £	£0.7bn	£0.9bn	£1.9bn	£2.6bn	Uprated values and significant increases in estimated whole life costs of SO & BUO. The SO continues to outperform BUO by a large margin.
A.03 Cost of interim measures	Qual. RAG	100	0	100	0	No change since Gate 2.

Note: For the monetised values, the price base at Gate 2 was 2021, and 2022 for the OAP review. The updated whole life cost estimates were based on inputs provided by the Cost Intelligence Team, which were based on an 80-year appraisal period. These were adjusted to provide comparable estimates to the Gate 2 OAP, which was based on a 100-year appraisal period. See Appendices 7A and B for a breakdown of capital costs (undiscounted) and operating costs (discounted).

The monetised elements of the Gate 2 assessment were updated for the OAP review to ensure results remain comparable and reflect the best available evidence. Specifically, the Gate 2 monetised values have been updated to a consistent 2022 price base and reviewed to reflect any methodological updates that have occurred since Gate 2. The original and updated Gate 2 scores are presented in Table 14.

Table 14: Updated monetised scores, Gate 2 OAP and OAP review

Criteria	Gate 2 scores (as reported)		Gate 2 scores (updated)		OAP review scores	
	SO	BUO	SO	BUO	SO	BUO
E.03 Climate regulation	£300.6k	£185.6k	£353.1k	£180.4k	£353.1k	£180.4k
E.04 Natural hazard regulation	£23.2k	£46.7k	£24.5k	£49.4k	£24.5k	£49.4k
E.07 Food production	-£337.8k	-£470.7k	-£181.0k	-£252.3k	-£181.0k	-£252.3k
E.08 Embodied and op. carbon	-£15.5m	-£26.7m	-£26.4m	-£41.7m	-£109.0m	-£153.9m
S.01 Recreation and amenity	-£3.0m	-£2.0m	-£3.2m	-£2.1m	-£3.2m	-£2.1m
A.01 Whole life cost	£684.1m	£927.5m	£745.1m	£1,010m	£1,886m	£2,644m

Monetised appraisal outputs are sensitive to the price base year and to standardised parameter values (e.g., unit values used to monetise environmental outcomes). Even where the underlying physical impacts are unchanged, bringing values onto a common and current price base avoids artificial differences arising from inflation or inconsistent valuation years, and ensures that comparisons between options are made on a like-for-like basis.

For the majority of sub-criteria, the ranking of the SO and BUO at Gate 2 remains unchanged in the OAP review. The relative performance of the SO and BUO changed for the following sub-criteria:

- **Flood risk:** The ranking switched with the BUO outperforming the SO at Gate 2 and the SO outperforming the BUO in the OAP review.
- **Historic environment (terrestrial):** The SO and BUO scored equally at Gate 2, with the SO outperforming the BUO in the OAP review.
- **Landscape & townscape:** The SO and BUO scored equally at Gate 2, with the SO outperforming the BUO in the OAP review.

Changes to 'normalised' scores

In the Gate 2 MCDA, to allow the various sub-criteria, which were measured in different units, to be compared on a consistent basis, each raw sub-criterion value was converted into a normalised score on a 0-100 scale, using a localised approach. Under this approach, the lowest performing option(s) for a given sub-criterion is assigned a score of 0 and the best performing option(s) is assigned a score of 100, with any intermediate performers scaled proportionately between these bounds.

The Gate 2 and OAP review normalised scores are presented in Table 15.

Table 15: Normalised (0-100) scores for the SO and BUO, Gate 2 OAP and OAP review

Sub-criteria	Type	Gate 2 scores		OAP review scores		Commentary
		SO	BUO	SO	BUO	
C.01 Tap water quality	Qual. RAG	100	50	100	50	No change since Gate 2.
C.02 Resilience of supply	Qual. RAG	50	25	50	25	No change since Gate 2.
E.01 Biodiversity Net Gain	BNG units	62	100	62	100	No change since Gate 2 as not re-assessed.
E.02 Habitats & biodiversity	Qual. RAG	75	25	75	25	No change since Gate 2.
E.03 Climate regulation	PV £	29	12	18	6	Updated values but inputs not re-assessed.
E.04 Natural hazard regulation	PV £	34	93	34	93	As per E.03.
E.06 Water purification	Qual. RAG	11	20	11	20	No change since Gate 2.
E.07 Food production	PV £	35	0	35	0	As per E.03.
E.08 Embodied & operational carbon	PV £	77	45	31	0	The SO continues to outperform BUO by a large margin.
E.12 Water abstraction	Qual. RAG	50	100	50	100	No change since Gate 2.
E.13 Landscape townscape and	Qual. RAG	75	75	100	75	Change from equal scoring at Gate 2 to SO outperforming BUO in OAP review.
E.14 Flood risk	Qual. RAG	0	100	100	75	Ranking switches, with SO outperforming BUO in OAP review.
E.15 Coastal processes	Qual. RAG	100	100	100	100	No change since Gate 2.
S.01 Recreation and amenity	PV £	18	70	18	70	As per E.03.
S.02 Historic env. (terrestrial)	Qual. RAG	0	0	25	0	Change from equal scoring at Gate 2 to SO outperforming BUO in OAP review.
D.01 Supply chain capacity risks	Qual. RAG	50	50	50	50	No change since Gate 2.
A.01 Whole life cost	PV £	60	26	34	0	The SO continues to outperform BUO by a large margin.
A.03 Cost of interim measures	Qual. RAG	100	0	100	0	No change since Gate 2.

Note: For sub-criteria where a higher value represents better performance, higher raw values map to higher normalised scores; where a lower value represents better performance (e.g. cost-type measures), the scale is inverted so that lower raw values map to higher normalised scores. Where options have the same raw value for a criterion, they receive the same normalised score.

The normalised scores preserve the same underlying performance relationships shown in the raw sub-criterion values in Table 13. In particular, for each sub-criterion the option identified as higher performing in Table 13 is also the option that receives the higher normalised score in Table 15 (i.e., the “better performing” cells highlighted in green are consistent across the two tables).

Where the raw values carried forward unchanged from Gate 2 into the OAP review, the corresponding normalised scores remain unchanged; where raw values were updated, the magnitude of the normalised scores may change, but the direction of relative performance is maintained by construction of the normalisation approach.

Key changes in the normalised scores reflected the changes in the raw scores, as discussed below:

For embodied & operational carbon (E.08) and whole life cost (A.01) there were large shifts in the normalised scores reflecting the absolute increases in monetised values for both the SO and BUO between Gate 2 and the OAP review. The SO scoring continued to outperform the BUO by a large margin, as at Gate 2.

For landscape & townscape (E.13) and historic environment - terrestrial (S.02), the scoring switched from the SO and BUO having the same scores at Gate 2 to the SO outperforming the BUO in the OAP review;

For flood risk (E.14) the ranking of the scores switched, with the SO outperforming the BUO in the OAP review.

The only other change in normalised scores between Gate 2 and the OAP review was in Climate Regulation (E.03). The reason is that it incorporates updated carbon values, which affect the two options differentially according to the scale and mix of habitat types impacted.

Core scenario review

To support a rounded assessment of best value, the Gate 2 OAP adopted a set of 'best value rankings'. These provided five complementary lenses through which to compare the options:

- **Best Value Ranking 1 – least cost:** ranks options on whole life cost of the core SRO scheme only— i.e. the lowest-cost way to meet the 2027 supply requirement. This does not reflect affordability/deliverability considerations or NSI (customers, environment, society, deliverability).
- **Best Value Ranking 2 – affordability:** ranks options on the overall cost of achieving the supply requirement, including interim measures where an option cannot be delivered on time. Does not reflect NSI.
- **Best Value Ranking 3 – NSI:** ranks options on NSI across customers, environment, society, and deliverability. Does not consider cost or affordability.
- **Best Value Ranking 4 – NSI per £100m of whole life cost:** ranks options on NSI relative to whole life cost, showing impact delivered per £ spent. This is the closest analogue to a benefit-cost style efficiency metric.
- **Best Value Ranking 5 – blended NSI and affordability:** ranks options on NSI relative to a broader affordability-based cost measure.

Table 16 compares how each option performs at Gate 2 with the updated “core OAP review” analysis, which refreshes the cost and impact inputs on a consistent basis.

Table 16: Best value rankings, core analysis, Gate 2 and OAP review

Best value ranking	Gate 2		OAP review		Commentary
	SO	BUO	SO	BUO	
1 Least cost	£0.69bn	£0.93bn	£1.89bn	£2.65bn	The OAP review suggests higher baseline costs than Gate 2 for both options, but it does not change the ordering: the SO remains the least-cost option and by a wider margin.
2 Affordability	80	13	67	0	The affordability lens strongly differentiates the options. The updated cost estimates suggest that the BUO will be even costlier and take longer to deliver than anticipated at Gate 2.
3 NSI	46	53	54	49	The Gate 2 ordering on NSI is switched in the OAP review, with the SO moving ahead of the BUO. Importantly, the changes are modest in magnitude compared to the cost and affordability shifts – suggesting that the main driver of changes in best value is the updated cost picture rather than a large swing in underlying social impacts.

Best value ranking	Gate 2		OAP review		Commentary	
	SO	BUO	SO	BUO		
4	NSI per £100m of whole life cost	6.7	5.7	2.9	1.9	Because whole-life costs increase substantially in the OAP review, both options deliver less NSI per £ spent than previously estimated. However, the SO remains the more cost-effective option on this lens.
5	Blended NSI & affordability	63	33	61	25	When affordability and NSI are considered together, the SO consistently ranks higher in both Gate 2 and the OAP review. The OAP review indicates that the SO's combined position is relatively robust, whereas the BUO's combined position weakens, driven mainly by affordability.

While the Gate 2 MCDA showed the BUO marginally ahead on NSI alone, under the OAP review, the SO outperforms the BUO across all five rankings. The OAP review findings therefore confirm and strengthen the conclusion reached at Gate 2 that the SO performs better than the BUO in best value terms.

Review of alternative weightings

The core scenario review described in the previous sections shows that, with the updated MCDA inputs, the SO outperforms the BUO across all five best value rankings. However, overall rankings can be sensitive to how individual and cluster sub-criteria and affordability are weighted when aggregating results.

For this reason, a structured sensitivity check was undertaken as part of the Gate 2 OAP, with testing of multiple weighting scenarios to investigate the robustness of the results, and these tests were reapplied in the OAP review.

Weighting scenarios

Five NSI weighting scenarios were applied, varying the relative emphasis between the main NSI impact clusters (customers, environment, society, deliverability):

- **Scenario 1 – core analysis:** equal weighting at sub-criteria level (implying a higher combined weight for environment/society relative to customers in aggregate).
- **Scenario 2 – less weight on environment and society:** reduces the relative emphasis on environment/society and increases the relative emphasis on direct customer impacts.
- **Scenario 3 – equal weighting for customer and environment and society:** increases the weight on customer impacts so customers and environment/society carry similar importance overall.
- **Scenario 4 – equal weighting across clusters:** customers, environment, society and deliverability weighted equally at cluster level.
- **Scenario 5 – customer preferences:** cluster weights aligned to customer engagement, increasing the emphasis on customers (and deliverability) relative to the core analysis.

Four affordability weighting scenarios were also tested, varying the emphasis between the two cost components:

- **Scenario 1 – core analysis:** equal weighting between the two affordability cost components, with whole life cost and interim measures each weighted at 50%.
- **Scenario 2 – more weight on whole life cost:** WLC is the dominant driver of overall affordability, weighting WLC at 80% and interim measures at 20%.
- **Scenario 3 – slightly more weight on whole life cost:** assumes whole life cost is somewhat more important than interim measures, weighting WLC at 60% and interim measures at 40%.

- **Scenario 4 – more weight on interim measures:** the converse of Scenario 2, assuming interim measures drive affordability more strongly, weighting interim measures at 80% and whole life cost at 20%.

A total of 54 alternative weighting combinations were tested across the best value rankings, as follows:

- The four affordability weighting scenarios were applied to Best Value Ranking 2;
- The five NSI weighting scenarios were applied to Best Value Ranking 3 and Best Value Ranking 4;
- The five NSI scenarios and four affordability scenarios (producing 20 weighting combinations) were applied to Best Value Ranking 5a and Best Value Ranking 5b.

Note that it was not possible to apply alternative weighting combinations to Best Value Ranking 1 as it contains only one criterion (Whole Life Cost);

Weighting analysis results

Table 17 summarises the outcomes of the 54 tests, which were conducted for both the Gate 2 and OAP review inputs. It shows the number and percentage of alternative weighting combinations in which, alternately, the SO and BUO rank higher.

Table 17: Testing outcomes for alternative weighting combinations

Best value rankings		Gate 2		OAP review	
		SO	BUO	SO	BUO
1	Least cost	Not applicable – no weightings applied			
2	Affordability	4 (100%)	0	4 (100%)	0
3	NSI	2 (40%)	3 (60%)	5 (100%)	0
4	NSI per £100m of whole life cost	5 (100%)	0	5 (100%)	0
5a	Blended NSI and affordability: core weightings	20 (100%)	0	20 (100%)	0
5b	Blended NSI and affordability: focus group weightings	19 (95%)	1 (5%)	20 (100%)	0
Total		50 (93%)	4 (7%)	54 (100%)	0

The Gate 2 results showed a limited trade-off between NSI and affordability. Under Best Value Ranking 3 (NSI), the BUO ranks higher in three out of five weighting combinations, reflecting its marginally stronger performance on NSI in the Gate 2 core results (see Table 15).

Where the alternative NSI weighting scenarios placed greater emphasis on the sub-criteria in which the SO performs relatively better (for example, climate regulation or embodied and operational carbon), the SO ranks higher under NSI, i.e. in the remaining two combinations. In other words, at Gate 2 the identity of the higher-ranking option under NSI alone depends on how NSI weights are set.

However, once affordability is brought into the assessment, the SO almost always outperforms the BUO in the Gate 2 weighting scenarios. Across the metrics that combine affordability and NSI, i.e., NSI per £100m of whole life cost, and the blended NSI-affordability metric using core weightings, the SO ranks higher than the BUO in all combinations. The only exception in the Gate 2 suite of tests occurred under the customer-preference version of the blended metric, where the BUO ranked higher in 1 of 20 combinations (and the SO in 19 of 20). This indicates that, at Gate 2, there was one edge case where a particular combination of NSI and affordability weightings was sufficient to overcome the SO's affordability advantage.

The OAP review results remove the trade-off between NSI and affordability entirely. In the OAP review, the SO ranks higher than the BUO for all combinations, for every weighting-sensitive metric reported (including NSI alone). That is, the SO outperforms the BUO not only on affordability lenses, but also on NSI itself, across all tested weighting assumptions.

Practically, this means the earlier Gate 2 question – whether the BUO’s higher cost might be justified by slightly higher NSI – no longer applies under the OAP review inputs: the SO is now both more affordable and delivers higher NSI and therefore remains higher-ranking than the BUO under every tested weighting combination.

7.5. Sensitivity testing

Sensitivity testing was undertaken at Gate 2 to confirm the robustness of the best value appraisal results and to understand how far values would need to change to alter the ranking of options. In particular, these considered:

- **Changes in cluster weightings**, to examine whether adjustments could change the performance of options within Best Value Ranking 3 (NSI); and
- **Changes in costs and affordability**, to test whether variations could affect rankings within Best Value Ranking 1 (Least Cost) and 2 (Affordability), and Best Value Ranking 4 (NSI per £100m of cost).

These tests were applied alongside alternative weighting scenarios to Check for disproportionate influence of any single sub-criterion and to consider potential non-linear effects if options were scaled or evolved.

The results demonstrated that rankings were broadly stable across all tested scenarios, with the SO performing better than the BUO apart from in Best Value Ranking 3, in which the BUO performed better. No scenario produced a reversal of the top two options, confirming that the MCDA outcomes were resilient to reasonable variations in assumptions.

As part of the OAP review, these tests have been reviewed and, where appropriate, equivalent tests have been performed to validate earlier findings. Further sensitivity tests have also been carried out to examine the impacts of uncertainty associated with the specific circumstances of the OAP review, including potential changes in option parameters and assumptions.

Changes in cluster weightings

At Gate 2, sensitivity analysis explored how far cluster weightings would need to change to alter the relative performance of the SO and BUO under Best Value Ranking 3 (NSI). This was appropriate because the SO did not lead across all clusters: it ranked behind the BUO for Environment & Society. Testing showed the weight shifts required to move the BUO up the ranking.

In the OAP review, the position has changed significantly. The SO now outperforms or equals the BUO under all cluster sub-criteria, as shown in Table 18. This means there is no weighting scenario across these clusters that could produce a different result.

Table 18: Gate 2 and updated MCDA results by cluster

Cluster	Gate 2		OAP review	
	SO	BUO	SO	BUO
Customer	75	25	75	38
Environment and society	42	57	51	51
Deliverability	50	50	50	50
Affordability	80	13	67	-

This result reinforces the robustness of the SO’s position: its performance advantage is not dependent on any particular weighting assumption but is consistent across all clusters. The fact that this type of sensitivity testing is no longer valid underlines the strength of the SO as the most appropriate option to adopt.

Changes in cost and affordability

Best Value Ranking 1: Least Cost

At Gate 2, sensitivity analysis examined how much costs would need to change for the SO and the BUO to switch positions under Best Value Ranking 1 (Least Cost). With a £244 million difference in the cost estimates of the two options in present value terms, significant percentage changes in costs were required:

- The SO needed to increase in cost by 35% to drop below the BUO.
- The BUO needed to decrease in cost by 26% to rank above the SO.

This indicated that rankings were not sensitive to minor cost variations and reinforced the robustness of the Gate 2 outcome.

Using current cost estimates, the same test has been revisited. The changes required for the SO and BUO to switch rank are shown in Table 19.

Table 19: Switching value analysis on whole life costs

Scenario	SO	BUO	% increase SO	% decrease BUO
Gate 2 (total costs)	£687m	£930m	+35%	-26%
OAP review (total costs)	£1,886m	£2,644m	+40%	-29%
OAP review (SO-only vs. BUO-only costs)	£313m	£1,071m	+242%	-71%

Note: common costs of £1,573m have been held constant in the SO-only vs BUO-only scenario.

The updated analysis shows that even larger changes are now required to overturn the ranking:

- +40% increase in SO total costs or -29% reduction in BUO total costs.
- When common costs, i.e. elements of the two options that are the same, are excluded, the changes become larger: +242% for SO-only and -71% for BUO-only.

The fact that such significant cost changes would be needed to alter the ranking strongly reinforces the SO as the better option under the Least Cost lens.

Best Value Ranking 2: Affordability

The change in cost required to bring about a switch in ranking under Best Value Ranking 2 (Affordability) would be even greater than under Best Value Ranking 1 (Least Cost). This is because Affordability is based on the combined score of two sub-criteria within the Affordability cluster: A.01 – Whole Life Cost and A.02 – Potential costs of interim measures.

The SO scores 100 on A.02, compared to 0 for the BUO, meaning that any attempt to overturn the ranking would require a much larger increase in the SO's whole life cost or a much larger decrease in the BUO's whole life cost to compensate for this difference.

This additional factor is not present in Best Value Ranking 1, which considers whole life cost alone, and therefore the percentage changes needed under the Affordability lens would be significantly higher, reinforcing the stability of the SO's position.

Best Value Ranking 4: NSI per £100m of whole life costs

Gate 2 also examined how much the whole life cost would need to change for the SO and BUO to switch positions under Best Value Ranking 4, which measures NSI per £100m of whole life cost.

The switching value analysis was revisited in the OAP review using updated costs and NSI scores. Table 20 shows the percentage changes required for the SO and BUO to switch rank under the updated position.

Table 20: Switching value analysis on Best Value Ranking 4

Scenario	Option	NSI score	Whole life cost	Change needed to switch rank
Gate 2	SO	46	£687m	+17%
	BUO	53	£930m	-15%
OAP review	SO	54	£1,886m	+53%
	BUO	49	£2,644m	-35%

Because NSI per £100m is a ratio, the effect of cost changes is amplified compared to rankings based on whole life cost alone. At Gate 2, relatively modest changes (+17% for SO or -15% for BUO) could have altered the ranking, reflecting the closer balance between NSI scores and costs at that stage.

Though the SO's cost has increased substantially since Gate 2, the increase in the BUO's cost was proportionately greater, i.e. it was 36% more costly at Gate 2 and 40% more costly under the OAP review. When taken together with the switch in ranking in NSI scores described above (with the SO ranking below the BUO at Gate 2 and above it under the OAP review), this means that the percentage changes required to overturn the ranking are far greater than at Gate 2: a 53% increase in SO's cost (compared to 17% at Gate 2) or a 35% reduction in BUO's cost (compared to a 15% reduction at Gate 2).

Testing OAP review uncertainty

NSI results

The OAP review analysis suggests that unlike at Gate 2, the SO now outperforms the BUO under Best Value Ranking 3 (NSI), as shown in Table 21.

Table 21: NSI, unweighted scores

Cluster	Gate 2		OAP review	
	SO	BUO	SO	BUO
Customer	150	75	150	75
Environment and society	575	780	660	664
Deliverability	50	50	50	50
Total	775	905	860	789

The sum of all unweighted NSI sub-criteria gives a total of 860 for the SO and 789 for the BUO, a net advantage of +71 points for the SO. This contrasts with +130 points for the BUO at Gate 2.

The SO maintains a strong advantage in Customer, performs marginally better in Environment and Society, and is equal on Deliverability. As a consequence, the SO's lead under NSI is not dependent on a single cluster sub-criterion but is distributed across the NSI themes.

Uncertain sub-criteria and the switching value required to change the ranking

A number of Environment and Society sub-criteria could not be re-assessed for the BUO owing to insufficient information:

- Biodiversity Net Gain (BNG)
- Natural hazard regulation
- Climate regulation

- Food production
- Recreation & amenity

In the core OAP review analysis, these five sub-criteria were therefore retained using their Gate 2 scores for both options. While revised assessments were available for the SO, these were not incorporated into the OAP review analysis because they were derived using a different methodology and therefore cannot be used to compare the SO and BUO on a like-for-like basis.

Under the baseline position (i.e., carrying forward Gate 2 scores for the five sub-criteria), the BUO already outperforms the SO across these sub-criteria by 101 points in aggregate (268 vs 168), as shown in Table 22.

Table 22: Five uncertain Environment and Society sub-criteria retained from Gate 2

Sub-criteria	SO	BUO	Difference
BNG	62	100	-38
Climate regulation	18	6	12
Natural Hazard regulation	34	93	-58
Food production	35	0	35
Recreation & amenity	18	70	-52
Total	168	268	-101

Note: 'Difference' is shown as SO – BUO; negative values indicate BUO advantage. Note that the total doesn't sum to 100 because of rounding.

A switching-value test was undertaken to establish the extent to which the BUO's combined performance across the five uncertain sub-criteria would need to further improve (relative to the baseline assumption) for the BUO to move ahead of the SO in terms of overall NSI.

As the SO still leads overall on NSI by 71 points (860 vs 789), for the BUO to overtake the SO on NSI, its advantage across the five sub-criteria would need to increase from 101 to more than 172 points.

Distributing the switching value across the uncertain sub-criteria

The switching value for the five uncertain Environment and Society sub-criteria is therefore an additional 71-point swing towards the BUO relative to the baseline position. In practice, any such swing would need to be delivered through a limited number of sub-criteria for two reasons:

- **Bounded scoring:** each sub-criterion is capped between 0 and 100; and
- **Limited headroom:** for some sub-criteria, the BUO's baseline score is already close to the upper bound, limiting the scope for further uplift, as shown in Table 23.

Table 23: BUO headroom under bounded 0-100 scoring

Sub-criteria	Baseline BUO score	Maximum additional uplift
BNG	100	0
Climate regulation	6	94
Natural hazard regulation	93	7
Food production	0	100
Recreation & amenity	70	30

This shows that the required uplift in points would need to be driven primarily by sub-criteria where the BUO currently scores low and therefore has substantial headroom, most notably food production and climate regulation. By contrast, BNG has no headroom (BUO already scores 100), and natural hazard regulation has very limited scope for further improvement given the high baseline score.

The illustrative distributions shown in Table 24 demonstrate the scale and concentration of change required to overturn the ranking. These are not forecasts; they are stress-test examples illustrating the boundary at which the BUO ‘overtakes’ the SO’s NSI score.

Table 24: Illustrative distributions achieving an additional 93-point swing towards the BUO

Illustration	Food production	Climate regulation	Recreation	Natural hazard	Total additional
A Food production only	+71	-	-	-	+71
B Climate regulation only	-	+71	-	-	+71
C Food production and recreation uplift	+51	-	+20	-	+71
D Food production, recreation, and natural hazard	+43	-	+20	+8	+71
E Food and climate regulation uplift	+40	+31	-	-	+71

These illustrations show that such a reversal would require either:

- i. a highly concentrated change in one sub-criterion currently scored very low (for example, food production increasing from 0 to the low-70s, or climate regulation increasing by a similar magnitude), or
- ii. substantial combined increases across two to three sub-criteria, with the majority of the swing still needing to come from food production and/or climate regulation due to bounded headroom on other sub-criteria.

The next stage of sensitivity testing considers whether changes of this magnitude are plausible for the BUO given available evidence on option characteristics, footprint, and likely interactions with land use.

Implied impact on receptors

The switching-value distributions above are expressed in normalised scores (0–100) and show that for BUO to move ahead of the SO in the overall NSI ranking, the five uncertain sub-criteria would collectively need to deliver an additional 71-point swing in the BUO’s total NSI score relative to the baseline.

To aid interpretation, illustrative score uplifts were converted into the corresponding implied changes in underlying physical quantities for the two sub-criteria with the greatest headroom – and therefore the greatest potential influence on the ranking: food production (BUO baseline score 0) and climate regulation (BUO baseline score 6).

Food production

Food production performance is driven by the extent of arable land affected, with poorer performance associated with greater land take. Accordingly, Table 8 interprets an illustrative BUO score uplift as requiring a reduction in the BUO’s arable land take, with the change applied across both temporary and permanent land take components (i.e., reductions in construction-related and permanent arable land take).

Table 25 shows that achieving material score uplifts on food production would require substantial reductions in total arable land take.

Table 25: Food production – implied arable land take associated with score uplift

Illustrative uplift in BUO score	Implied net provision	Change vs baseline BUO
+30 points	-12.1 ha.	c.-3.8 ha. (-24%)
+40 points	-10.8 ha.	c.-5.1 ha. (-32%)
+43 points	-10.4 ha.	c.-5.5 ha. (-34%)
+51 points	-9.4 ha.	c.-6.5 ha. (-41%)
+71 points	-6.8 ha.	c.-9.0 ha. (-57%)

For example, a +30-point uplift implies reducing net arable land take from the Gate 2 OAP 'baseline' reduction of 15.9 ha to a reduction of approx. 12.1 ha. i.e., c. 3.8 ha less land take, an approx. 24% reduction. Larger uplifts require step changes in impacts:

- a +51-point uplift implies a reduction from the baseline to around 9.4 ha, i.e. 6.5 ha less land take, an approx. 41% reduction;
- a +71-point uplift implies a reduction from the baseline to around 6.8 ha, i.e. 9.0 ha less land take, an approx. 57% reduction.

Climate regulation

Climate regulation performance reflects the net balance between land take associated with the infrastructure footprint and the extent of reinstatement/offsetting that generates climate regulation benefits. Table 26 shows that even modest score improvements imply meaningful additional reinstatement/offsetting relative to the baseline BUO position.

Table 26: Climate regulation – implied net land reinstatement associated with score uplift

Illustrative uplift in BUO score	Implied net provision	Change vs baseline BUO
+7 points	268 ha.	c.36 ha. (+15%)
+31 points	391 ha.	c.158 ha. (+68%)
+50 points	488 ha.	c.255 ha. (+110%)
+71 points	595 ha.	c.363 ha. (+156%)

Note: assumes construction land take is held constant. Habitats which influence this score include woodland, grassland, and freshwater. The distribution between these habitats is assumed to be fixed according to baseline habitat areas for the BUO in the Gate 2 OAP.

A +7-point uplift implies an increase from baseline provision in the Gate 2 OAP from 232 ha to 268 ha, i.e. an additional 36 ha, an approx. 15% increase. Uplifts at the level that could materially affect the overall switching value (e.g. +31 to +50 points) imply increases of approximately 158 to 255 ha, representing very substantial increases relative to baseline (c. 68% to 110%). An uplift of +71 points would imply an increase from 232 ha in the Gate 2 baseline to 595 ha, i.e. an increase of 363 ha, an approx.156% increase.

Interpretation

Table 25 and Table 26 show that the larger uplift cases imply step changes in physical outcomes: substantial reductions in arable land take and/or substantial increases in reinstatement/offsetting provision of climate regulating habitats.

The magnitude of the habitat changes needed to overturn the SO's lead in the overall NSI ranking indicates that the ranking is robust, i.e. very substantial changes in the Gate 2 receptor impacts would be needed to overturn it. Moreover, even in circumstances in which the NSI ranking were returned to a neutral position, the SO would still perform substantially better on affordability and hence comfortably outperform the BUO in terms of overall best value.

8 Business Evaluation and Conclusion

8.1. Introduction and Overview

The aim of the business evaluation and decision process was to draw together the full range of evidence generated through the OAP review in a rational process to conclude whether the recommendation in relation to the SO made at the Gate 2 OAP stage would be made now, in light of the changes that have occurred in the intervening period.

A proportionate business evaluation process for the OAP review was agreed with the SWS working group, based on the key elements in the Gate 2 OAP business evaluation, as follows:

- The Legal and Policy Obligations and Strategic Objectives against which the options were assessed in the Gate 2 OAP were reviewed and updated by SWS' legal and technical advisors, drawing on the changes in contextual factors considered at the scoping stage of the OAP review;
- The information inputs that informed the business evaluation within the Gate 2 OAP were reviewed and updated to ensure the OAP review business evaluation was undertaken with reference to an up-to-date suite of guidance documents;
- An assessment of the compliance of the SO and BUO with the updated Legal and Policy Obligations was carried out by SWS' legal advisors;
- An initial assessment of the alignment of the SO and BUO with the updated Strategic Objectives was undertaken by appropriately qualified SWS staff and advisors;
- Two business evaluation workshops were held to review and agree the outcomes of the assessments of the SO and BUO against the Legal and Policy Obligations and Strategic Objectives and to consider the overall comparative performance of the SO and BUO; and
- The business evaluation and conclusion were reviewed and approved at SWS's Project Delivery Group meeting on 7th April, 2026.

8.2. Updated Legal and Policy Obligations and Strategic Objectives

The Legal and Policy Obligations that were identified at Gate 2 within seven separate categories, were reviewed by SWS' legal advisors. The only category requiring substantive update was to the existing and future environmental obligations. The updated obligations are described in Table 27, along with a brief explanation of the changes.

Table 27: Updated Legal and Policy Obligations

No.	Name	Detail	Notes
1	Supply Duty	SW will ensure that SW can continue to meet our supply obligation under s37 of the Water Industry Act 1991 (WIA91).	No change to the Gate 2 obligation/requirement
2	Use of Drought Orders and Drought Permits	SW will ensure that SW have as little recourse as reasonably possible to resorting to the use of Drought Orders and Drought Permits in maintaining our supply obligation. SW will work with the EA and NE to ensure that SW are minimising our need to rely on Drought Orders and Drought Permits and are 'application ready' in accordance with the s20 Agreement and will meet any reasonable conditions included in the Drought Permits and orders for the rivers Test and Itchen and the Candover stream.	No change to the Gate 2 obligation/requirement
3	Water Framework Directive	SW are fully aware of the Water Framework Directive driver behind the 2027 deadline and will ensure this is taken fully into account in our decision-making, ensuring consistency and compliance with relevant requirements of the Directive.	No change to the Gate 2 obligation/requirement
4	Compliance with existing and future environmental legislation	SW will ensure that the chosen solutions are compliant with the Habitats Directive and relevant UK legislation regarding protection and conservation of habitats and the environment. SW will track the progress of the Environment Act 2021 and relevant secondary legislation and ensure that the Programme takes account of environmental principles, Environmental Improvement Plans and other relevant provisions.	Minor update to the Gate 2 obligation/requirement so that reference to Environment Bill is compliance with the Environment Act 2021 and relevant secondary legislation.
5	Section 20 agreement	SW will continue to ensure compliance with the S20 Agreement between SW and the Environment Agency dated 29 March 2018, namely, to use 'all best endeavours' to implement the long-term scheme for alternative water resources set out in WRMP19 or in any updated or successor plan.	No change to the Gate 2 obligation/requirement
6	Biodiversity Net Gain and Wider Environmental Net Gain	SW will ensure that biodiversity and where appropriate wider environmental net gain are built into the Programme in line with legal and policy requirements.	No change to the Gate 2 obligation/requirement
7	National Policy Statement for Water Resources Infrastructure (NPSWRI)	SW will address and deliver on any other key requirements set out in the draft dNPSWRI and once designated, the NPSWRI including, for example, requirements in relation to climate change adaptation.	No change to the Gate 2 obligation / requirement except to update the name of the obligation/requirement to reflect that the NPSWRI has been designated

The Strategic Objectives against which the options were assessed in the Gate 2 OAP, of which there were three, were reviewed by SWS and its advisors. Updates were required to the 'Best Value' and 'Carbon' objectives, as described in Table 28.

Table 28: Updated Strategic Objectives

No.	Name	Detail	Notes
1	Best Value	SW will deliver solutions which provide the best value to our customers whilst discharging our “all best endeavours” legal obligation in the s20 agreement and all other legal and policy requirements and obligations.	No change to the Gate 2 obligation/requirement
2	Carbon	SWS will deliver solutions in relation to design, construction and operation of the proposed Development that are optimal in terms of whole life carbon emissions and reduce GHG emissions to as low as practicable, having regard to the UK’s climate change commitment of achieving net zero emissions by 2050.	This updates the net zero carbon objective at Gate 2, from: “SW will deliver solutions which ensure that SW can continue to make progress towards meeting, and to support and contribute to, Water UK’s commitment to become net zero carbon by 2030.”
3	Adaptability	SW will deliver solutions that are sustainable by being flexible and adaptable, including in terms of their: <ul style="list-style-type: none"> • capacity and scalability • ability to contribute to strategic reinforcement of the regional and national network • ability to rely on appropriate transitional measures to manage risks around delivery timescales, and • ability to allow for technological innovation 	Gate 2 obligation/requirement amended to remove reference to “ensure that all projects within the programme” and replace with “will deliver solutions” as the Strategic Objectives apply to the HWTWRP rather than a programme of works as envisaged at Gate 2.

8.3. Updated inputs

The information relied upon to inform the Legal and Policy Obligation and Strategic Objective evaluation at Gate 2, together with updated information used in the OAP review evaluation, is detailed in Table 29.

Table 29: Information sources for business evaluations (Gate 2 and OAP review)

Obligation / Objective	Information base - Gate 2	Information base - OAP review
Legal and Policy Obligations	<ul style="list-style-type: none"> • Gate 2 submission – draft Annex 4: Water Resources Modelling (v0.8) • Current SRO Delivery Schedules • Information in RAPID Priority Action response dated 26 July 2021 regarding alternative interim measures • Draft Consenting Evaluation slides 12th August 2021 	<ul style="list-style-type: none"> • Draft WRMP (May 2025) • Water Resources Planning Guideline, April 2023 • NPSWRI, July 2025 • Consenting Risk Review – Section 6
Best Value Strategic Objective	<ul style="list-style-type: none"> • Current SRO Delivery Schedules • Draft Consenting Evaluation slides 12th August 2021 • Draft MCDA Results • Solution Evolution Assessments • Legal & Policy Obligation Assessments • Option evaluation against Water Resource Planning Guidelines definition of best value 	<ul style="list-style-type: none"> • Consenting Risk Review – Section 6 • MCDA review – Section 7 • Water Resources Planning Guideline, April 2023 • Review of compliance with Legal & Policy Obligations

Obligation / Objective	Information base - Gate 2	Information base - OAP review
Carbon Strategic Objective	<ul style="list-style-type: none"> • Analysis in relation to carbon in the Consenting Evaluation • The full scheme description of each Option • How the solution accounts for carbon commitments • Consideration as to whether Options include measures such as: <ul style="list-style-type: none"> • Greater water efficiency • Buying green energy • Generating renewable energy 	<ul style="list-style-type: none"> • Carbon Management in Buildings and Infrastructure PAS 2080: Review of asset and operational consumable requirements, 2023 update.

8.4. Outcomes of SO and BUO Evaluations

The SO and BUO were individually assessed against the updated Legal and Policy Obligations and Strategic Objectives, drawing on the information / inputs outlines in Section 8.1. Provisional RAG ratings and narrative justifications were drafted by appropriately selected SMEs and validated through two workshop sessions held on 23rd February 2026 and 2nd March 2026.

The rankings of the SO and BUO across the various business evaluation lenses, i.e., consenting risk evaluation, MCDA, LPOs and Strategic Objectives, along with the overall ranking, are shown in Table 30 to Table 33.

The RAG rating for the assessment of the Options against each Strategic Objective used the same definitions as in the Gate 2 OAP, namely:

- **RED:** based on the available information, the Option does not meet and would not be expected to meet the relevant Strategic Objective;
- **AMBER:** based on the available information there is a risk that the Option may not meet or may not fully meet the relevant Strategic Objective or that significant known or expected barriers would need to be overcome in order for it to meet or fully meet the relevant Strategic Objective;
- **GREEN:** based on the available information the Option is considered to mainly or fully meet the Strategic Objective.

Table 30: Business Evaluation: MCDA

Summary Indicator	SO		BUO	
	Gate 2	OAP review	Gate 2	OAP review
MCDA Best Value Ranking 1 (least cost)	Rank: #1	Rank: #1	Rank: #2	Rank: #2
MCDA Best Value Ranking 2 (affordability)	Overall (unweighted) rank: #1; Alternative weightings: #1 for 4/4 tests	Overall (unweighted) rank: #1; Alternative weightings: #1 for 4/4 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 4/4 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 4/4 tests
MCDA Best Value Ranking 3 (NSI)	Overall (unweighted) rank: #2; Alternative weightings: #1 for 8/20 & #2 for 12/20 tests	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #1; Alternative weightings: #1 for 12/20 & #2 for 8/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests
MCDA Best Value Ranking 4 (NSI per £100m of whole life cost)	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests
MCDA Best Value Ranking 5a (NSI & affordability – core weightings)	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests
MCDA Best Value Ranking 5b (NSI & affordability – focus group weightings)	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #1; Alternative weightings: #1 for 20/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests	Overall (unweighted) rank: #2; Alternative weightings: #2 for 20/20 tests

Table 31: Business Evaluation: Consenting Risks

Summary Indicator	SO		BUO	
	Gate 2	OAP review	Gate 2	OAP review
Overall RAG rating / Qualitative summary	<p>Ranked first overall (higher ranked on 3 out of 25 criteria and ranked equally on the remaining 22 – See Appendix 5)</p> <p>This has less consenting risk than A1/A2 and it does not have the same level of marine HRA impact which is a significant determinant of consentability for A1/A2. It has less risk than B2/B5 as it does not require Otterbourne Lake – removes a further HRA risk Potential HRA challenges associated with pipeline watercourse crossings to Otterbourne, but potential overcome through engineering solution. Pipeline routing through National Supply Duty. The Future Needs Assessment has indicated that a required deployable output of 87Ml/d-95Ml/d is expected to be required, considering the risks to delivery of certain elements of WRMP19 and also a 1-in-500-year drought scenario. The Future Needs Assessment sets out the assumptions used in the analysis.</p> <p>The Outline Evolution Plan for Option B.4 states that Option B.4 can meet the upper end of the range specified in the Future Needs Assessment (95Ml/d) through various enhancements to the option Best Value In the round this option is evaluated as amber.</p> <p>The MCDA lenses where this option scored lowest are considered fewer material factors than consentability. This option also represents the second highest performing in WLC terms. Adaptability is a category under WRPG 'Best Value' lens where B.4 is evaluated as very high performing. Gate 2 Submission: Supporting Technical Report Annex 5: Options Appraisal 323 Park – need for engagement and further route development to minimise impacts and optimise the route Need to avoid direct and indirect impact on ancient woodland Uncertainty re break pressure tank and pumping station locations that would require effective siting post Gate 2 Eastney Outfall modelling indicates no risk to Langstone Harbour designations and technical evidence will need to be provided to support this.</p>	<p>The SO had lower consenting risk than the BUO at Gate 2 and this gap increased in the OAP review, with some decreases in consenting risks noted (see below)</p> <p>The Landscape / Seascape and Townscape and Visual Amenity (Criterion No. 11) scores were updated from Large Adverse Impact to Moderate Adverse Impact. While the SO no longer directly interfaces with the South Downs National Park (SDNP)²², there are potential adverse setting impacts for the SDNP requiring mitigation.</p> <p>For Interface with Future Development and Planning, the SO has been designed to reduce or avoid interfaces with other projects, justifying a change in the rating to from Moderate Adverse to Minor Adverse Impact.</p> <p>Though the absolute cost of the SO has increased substantially since Gate 2, the cost increase was lower than for the BUO, which means the cost differential in favour of the SO has increased.</p>	<p>Ranked second overall (lower ranked on 3 out of 25 criteria and ranked equally on the remaining 22 – see Appendix 5).</p> <p>This has less consenting risk than A1/A2 and it does not have the same level of marine HRA impact which is a significant determinant of consentability for A1/A2 (note this assumes that the zero pathway to Langstone can be shown) Potential HRA challenges associated with pipeline watercourse crossings to Otterbourne but potential overcome through engineering solution (applies to both options) Pipeline routing through National Park – need for engagement and further route development to minimise impacts and optimise the route Supply Duty The Future Needs Assessment has indicated that a required deployable output of 87Ml/d95Ml/d is expected to be required, taking into account the risks to delivery of certain elements of WRMP19 and also a 1-in-500- year drought scenario. The Future Needs Assessment sets out the assumptions used in the analysis. The Outline Evolution Plan for Option B.5 states that Option B.5 can meet the upper end of the range specified in the Future Needs Assessment (95Ml/d), through various enhancements to the option. Section 1.1.1.2 of the Water Recycling Schedule does not provide a current forecast delivery date. However, the options Best Value Option B.5 performs moderately against the Legal and Policy obligations with an amber assessment under every evaluation category assessed apart from in relation to the use of drought orders and permits. This option has mixed results under the lenses of Biodiversity and Natural Capital with the best performing MCDA score under the Biodiversity Net Gain lens, but the third worst performing option under Local Biodiversity and is the 3rd most expensive option in WLC terms. This option is also the second worst Gate 2 Submission: Supporting Technical Report Annex 5: Options Appraisal 330 Need to avoid direct and indirect impact on ancient woodland Uncertainty re break pressure tank and pumping station locations that would require effective siting post Gate 2 Eastney Outfall modelling indicates no risk to Langstone Harbour designations and technical evidence will need to be provided to support this Otterbourne Lake – details of the construction methodology and emergency discharge are still at an early stage, an adverse effect on integrity of the River Itchen SAC cannot be ruled out at this stage. It is likely however that the mitigation measures supported by further design/modelling and evidencing, will allow significant adverse effects to the River Itchen be avoided</p>	<p>The BUO had higher consenting risk than the SO at Gate 2 and this gap has increased in the OAP review, with some increases in consenting risks noted (see below).</p> <p>Across the four Biodiversity and Nature Conservation criteria (Criteria Nos 2,3,4,5), several of the Moderate Adverse Impacts scored at Gate 2 were updated to Minor Adverse Impacts for the BUO, although there were no changes in the 'Large Adverse Impacts'.</p> <p>The Landscape / Seascape and Townscape and Visual Amenity (Criterion No. 11) scores were updated from Large Adverse Impact to Moderate Adverse Impact. The BUO has potential adverse setting impacts for the SDNP requiring mitigation.²³ The increase in the size of the EBL drove a change in the BUO construction scoring for Traffic and Transport (Criterion No. 16), from Moderate Adverse Impact to Large Adverse impact, owing to a substantial increase in impacts on road users that are likely to require significant mitigation.</p> <p>The BUO continues to score as Moderate Adverse impacts for Interface with Future Development & Planning (Criterion No. 19), since design elements aimed at reducing or avoiding interfaces with other projects do not currently apply to BUO-only elements. The pipeline between Peel Common WSW and the WRP would intersect with the Stubbington Bypass (B3334) and new residential development to the west of Funtley, both of which have been developed since the Gate 2 OAP.</p> <p>For Whole life cost (Criterion No. 25), both the SO and BUO were scored as Moderate Adverse Impacts at Gate 2, although the BUO was more costly. The updated estimated present values of cost of the SO and BUO were, respectively, £1,886m and £2,644m (including capex and opex, modelled over an 80-year period). This represented a greater differential than at Gate 2 and the updated RAG ratings reflect this, with the SO retaining its Moderate Adverse Impact score and the BUO scored as Large Adverse Impact.</p>

²² The SO nevertheless falls within the setting of the SDNP and passes in proximity, with viewpoints in the SDNP predicted to experience significant effects during the construction of the Project.

²³ The increase in the assumed size of the EBL since Gate 2 may increase the differential impact with the SO more than the RAG ratings suggest.

Table 32: Business evaluation: Compliance with Legal & Policy Obligations

Summary indicator	SO		BUO	
	Gate 2	OAP review	Gate 2	OAP review
Supply Duty (RAG rating and justification)	The Future Needs Assessment has indicated that a required deployable output of 87MI/d-95MI/d is expected to be required, considering the risks to delivery of certain elements of WRMP19 and also a 1-in-500-year drought scenario. The Future Needs Assessment sets out the assumptions used in the analysis. 4.8.4 The Outline Evolution Plan for Option B.4 states that Option B.4 can meet the upper end of the range specified in the Future Needs Assessment (95MI/d) through various enhancements to the option.	SWS's emerging WRMP24 demonstrates that a supply of up to 90MI/d is required for the Hampshire area as soon as possible, and by 2034. A quantitative schedule risk analysis (QSRA) has demonstrated that there is an 80% probability that the SO will be completed on or before this date allowing for a 20% risk of the project being delivered later than this date, i.e. a 'P80' assessment. This represents a high level of confidence that the SO can meet the project requirement of delivery into supply of 90MI/d by 2034 in line with the requirement set out in SWS's emerging WRMP24. When compared with the BUO the SO performs favourably in respect of this legal and policy obligation.	The Future Needs Assessment has indicated that a required deployable output of 87MI/d-95MI/d is expected to be required, considering the risks to delivery of certain elements of WRMP19 and also a 1-in-500-year drought scenario. The Future Needs Assessment sets out the assumptions used in the analysis. The Outline Evolution Plan for Option B.5 states that Option B.5 can meet the upper end of the range specified in the Future Needs Assessment (95MI/d), through various enhancements to the option. Section 1.1.1.2 of the Water Recycling Schedule does not provide a current forecast delivery date. However, the options appraisal has been based on a forecast operational delivery date in Q4 2030.	SWS's emerging WRMP demonstrates that a supply of up to 90MI/d is required for the Hampshire area as soon as possible, and by 2034. The BUO was paused in May 2023 as a result of the risk to the delivery of the HWTWRP having decreased significantly following funding approval for HTR and a construction contract being awarded. Unpausing delivery of the BUO as an alternative to the SO would be achievable but it is expected this would require significant additional re-work. In all, rescheduling could be expected to take up to four to six months, at which point it would be possible to consider a new schedule and cost profile (See Gate 3 Interim Update, in which SWS reported on pausing Option B.5) but the earliest feasible delivery date is expected to fall a minimum of 2.5 years (due to redesign and environmental surveys etc) after the SO which is a fixed assumption that has been carried through the optioneering process. Therefore the BUO could not meet the date in SWS's emerging WRMP. If the realisation of risks results in a delay to the scheduled delivery date for the SO, it is considered likely that this delay would apply from the decision date to switch to the BUO meaning the BUO will perform worse than the SO in respect of this legal and policy obligation.
Use of Drought Orders & Drought Permits (RAG rating and justification)	For options B.4 and D.2 any alternative interim measures are assumed to be required from Q1 2027 until Q1 2030, amounting to 3 years. Therefore, when compared against the other option with a longer timeframe of reliance on such measures, these are more likely to be capable of satisfying the legal and policy requirement to ensure 'as little recourse as reasonably possible' to resorting to the use of drought orders and drought permits in maintaining compliance with SW's supply obligation.	Any alternative interim measures including Drought Permits and Drought Orders are assumed to be required until delivery of the long-term water supply solution for the Hampshire area. The SO has a shorter delivery timescale when compared with the BUO. Therefore, the SO is more likely to be capable of satisfying the legal and policy requirement to ensure that drought permits and drought orders are resorted to 'as little as reasonably possible' in maintaining compliance with SW's supply obligation.	For options A.1, A.2, B.2 and B.5 any alternative interim measures are assumed to be required from Q1 2027 until Q4 2030, amounting to around 3.5 years. This is around 6 months more than for options B.4 and D.2. Therefore, when compared against the other options, all of which forecast delivery in Q1 2030, this option does not ensure 'as little recourse as reasonably possible' to resorting to the use of drought orders and drought permits in maintaining Gate 2 Submission: Supporting Technical Report Annex 5: Options Appraisal 331 compliance with SW's supply obligation. If the obligation is to ensure as little recourse as possible to drought orders, then to select this one would not be consistent with the obligation.	The BUO has a longer delivery timeframe than the SO with an extended delivery schedule of a minimum of 2.5 years over the delivery schedule for the SO (due to redesign and environmental surveys etc). Any alternative interim measures including Drought Permits and Drought Orders are assumed to be required until delivery of the long-term water supply solution for the Hampshire area. Therefore, when compared against the SO, this option does not ensure 'as little recourse as reasonably possible' to resorting to the use of drought orders and drought permits in maintaining compliance with SW's supply obligations
Water Framework Directive (RAG rating and justification)	The assessment concludes that it is considered unlikely that this option would result in a non-compliance with the Water Framework Directive, and it could be designed to ensure consistency with the Water Framework Directive. As such selection of this option could be consistent with the legal and policy obligation, subject to appropriate mitigation. On the basis that mitigation, which is yet to be designed, will be relied upon to ensure compliance with the Water Framework Directive, although it is assumed that this can be achieved.	The Water Framework Directive Assessment concludes that this option will not result in a non-compliance with the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, which implement the Water Framework Directions in England, subject to appropriate mitigation which will be secured through the DCO.	The assessment concludes that it is considered unlikely that this option would result in a non-compliance with the Water Framework Directive, and it could be designed to ensure consistency with the Water Framework Directive. As such selection of this option could be consistent with the legal and policy obligation, subject to appropriate mitigation. On the basis that mitigation, which is yet to be designed, will be relied upon to ensure compliance with the Water Framework Directive, although it is assumed that this can be achieved.	A full Water Framework Directive Assessment has not been undertaken in relation to this option, and as such further design and development of mitigation has not been progressed for this option. However, the previous assessment concluded that it was unlikely that this option would result in a non-compliance with the Water Framework Directive (and therefore the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017) and could be designed to ensure consistency with the Water Framework Directive. Since specific mitigation for this option has not been developed the RAG rating remains amber.
Compliance with existing and future environmental legislation (RAG rating and justification)	The assessment concludes that an appropriate engineering solution would be required in order to ensure no adverse effects on the integrity of a terrestrial European site or sites as a result of construction. Such a solution has not yet been identified.	The Habitats Regulations Assessment concludes that this option will not result in an adverse effect on the integrity of a European site or sites as a result of construction or operation, subject to appropriate mitigation which will be secured through the DCO.	The assessment concludes that an adverse effect on integrity of the River Itchen SAC cannot be ruled out.	A full Habitats Regulations Assessment has not been undertaken in relation to this option, and as such further design and development of mitigation has not been progressed for this option. However, the previous assessment concluded that an adverse effect on the integrity of the River Itchen SAC could not be ruled out.
Section 20 agreement (RAG rating and justification)	This option is not part of the long-term scheme for alternative water resources set out in WRMP19. If this option were selected SW would expect to undertake an update of WRMP19 on the basis of there being a 'material change in circumstances', so as to include this option in an updated WRMP19. At the point when the option was included in the updated WRMP19 it would be brought within the terms of the s.20 Agreement, and to use 'all best Gate 2 Submission: Supporting Technical Report Annex 5: Options Appraisal 326 endeavours' to implement this option would be to continue to ensure compliance with the s.20 Agreement.	Following the completion of the Gate 2 OAP in December 2021 the SO was formally reported to RAPID at Gate 2 as the new Selected Option for SWS's Hampshire area. This was followed, also in December 2021, by SWS's WRMP19 annual review to Defra, notifying Defra formally of the update of this option in WRMP19. The SO is the strategic supply option selected in SWS's emerging WRMP24 for SWS's Hampshire area, and the Regional Plan for Water Resources South East (WRSE), which is the updated water resources planning position, and therefore represents the updated long-term scheme for alternative water resources for SWS's Western area. Using 'all best endeavours' to implement the SO will help ensure compliance with this legal and policy obligation	This option is not part of the long-term scheme for alternative water resources set out in WRMP19. If this option were selected SW would expect to undertake an update of WRMP19 on the basis of there being a 'material change in circumstances', so as to include this option in an updated WRMP19. At the point when the option was included in the updated WRMP19 it would be brought within the terms of the s.20 Agreement, and to use 'all best endeavours' to implement this option would be to continue to ensure compliance with the s.20 Agreement.	This option is not part of the long-term scheme for alternative water resources set out in SWS's emerging WRMP or WRSE's Regional Plan. If this option were selected SW would expect to undertake an update of SWS's emerging WRMP24 on the basis of there being a 'material change in circumstances', or if published via an annual review of WRMP24. WRSE's Regional Plan would also require updating. At the point when the option was included in the updated WRMP24 it would be brought within the terms of the s.20 Agreement, and to use 'all best endeavours' to implement this option would be to continue to ensure compliance with the s.20 Agreement.

Summary indicator	SO		BUO	
	Gate 2	OAP review	Gate 2	OAP review
BNG & wider ENG (RAG rating and justification)	SW provided us with a 'Level 3a Natural Capital and Biodiversity Net Gain Summary' by email on 13th August 2021. This indicates, for each option: Total temporary habitat lost during construction Total permanent habitat loss Total on -site re - instatement/creation Total off-site habitat creation/ BNG uplift It operates on an assumption that 10% biodiversity net gain will need to be demonstrated for any option which is to be progressed. At this stage in Adaptability, Option B.4 is considered to have the highest potential for evolvability and as an enabler for future projects that have the potential to jointly meet SW and PW's future demands. Option B.4 has the capability to be evolved to meet the highest perceived future need of 95M/d for this asset by 2040. In addition, it has the potential to be evolved further should there be any increased need beyond 2040, Gate 2 Submission: Supporting Technical Report Annex 5: Options Appraisal 327 scheme development, there is no information on exactly how biodiversity net gain would be achieved for each option. After Gate 2 further scheme development will be undertaken in relation to the Selected Option (and to a more limited degree the back-up option) and this will include further consideration of biodiversity net gain and environmental net gain.	At least 10% Biodiversity Net Gain (BNG) will need to be achieved by any option. This can be done onsite within the Order Limits or offsite or through a combination of onsite and offsite. For this option areas where BNG could be delivered onsite subject to agreement being reached with landowners have been identified. In addition, SWS is exploring options for procurement of offsite BNG units. The final BNG unit requirement based on detailed design and the plan for delivering onsite and details of allocated units will be provided for approval by the relevant authority post-DCO consent.	SW provided us with a 'Level 3a Natural Capital and Biodiversity Net Gain Summary' by email on 13th August 2021. This indicates, for each option: Total temporary habitat lost during construction Total permanent habitat loss Total on -site re - instatement/creation Total off-site habitat creation/ BNG uplift It operates on an assumption that 10% biodiversity net gain will need to be demonstrated for any option which is to be progressed. At this stage in scheme development, there is no information on exactly how biodiversity net gain would be achieved for each option. After Gate 2 further scheme development will be undertaken in relation to the Selected Option (and to a more limited degree the back-up option) and this will include further consideration of biodiversity net gain and environmental net gain.	At least 10% Biodiversity Net Gain (BNG) will need to be achieved by any option. This can be done onsite within the Order Limits or offsite or through a combination of onsite and offsite. For this option areas where BNG could be delivered onsite subject to agreement being reached with landowners have been identified. In addition, SWS is exploring options for procurement of offsite BNG units. The final BNG unit requirement based on detailed design and the plan for delivering onsite and details of allocated units will be provided for approval by the relevant authority post-DCO consent.
NPSWRI (RAG rating and justification)	Based on the risks in relation to dNPSWRI compliance regarding (i) terrestrial biodiversity, and (ii) Landscape, Seascape, Townscape and Visual Amenity this option is RAG rating AMBER in relation to this legal and policy obligation.	There has been a general strengthening of environmental protection requirements in national policy when comparing dNPSWRI as against NPSWRI, including in relation to biodiversity and nature conservation, but this is balanced out by strengthened policy support for SROs with the need for such projects now "critical and urgent" as opposed to just "immediate". Furthermore, the South East's future water supply deficit is expressly highlighted in NPSWRI.	Based on the risks in relation to dNPSWRI compliance regarding (i) terrestrial biodiversity, and (ii) Landscape, Seascape, Townscape and Visual Amenity this option is rated amber	There has been a general strengthening of environmental protection requirements in national policy when comparing dNPSWRI as against NPSWRI, including in relation to biodiversity and nature conservation, but this is balanced out by strengthened policy support for SROs with the need for such projects now "critical and urgent" as opposed to just "immediate". Furthermore, the South East's future water supply deficit is expressly highlighted in NPSWRI. It is therefore considered that, on balance,

Table 33: Business Evaluation: Alignment with Strategic Objectives

OAP process	Summary indicator	SO		BUO	
		Gate 2	OAP review	Gate 2	OAP review
Strategic Objectives	Best Value	The MCDA lenses where this option scored lowest are considered less material than consentability. This option also represents the second highest performing in WLC terms. Adaptability is a category under WRPG 'Best Value' lens where B.4 is evaluated as very high performing.	Though there has been a substantial increase in the Whole Cost Estimate since Gate 2, this is lower than the cost increase in the BUO. The SO now outperforms the BUO across overall Net Social Impacts, and the SO outperformed the BUO in all 54 alternative weighting scenarios that were tested. The SO's performance against the LPOs has improved since Gate 2 and it outperforms the BUO on five out of eight LPOs.	Option B.5 performs moderately against the Legal and Policy obligations with an amber assessment under every evaluation category assessed apart from in relation to the use of drought orders and permits. This option has mixed results under the lenses of Biodiversity and Natural Capital with the best performing MCDA score under the Biodiversity Net Gain lens, but the third worst performing option under Local Biodiversity and is the 3rd most expensive option in WLC terms. This option is also the second worst performing under the resilience lens.	There has been a substantial increase in the Whole Cost Estimate since Gate 2, and this was greater than cost increase in the SO. The BUO now ranks below the SO across overall Net Social Impacts and the BUO performed less well than the SO across all 54 alternative weighting scenarios that were tested. The BUO's performance against the LPO in relation to Supply Duty deteriorated, and the BUO performs less well than the SO on five of eight LPOs.
	Carbon	Not enough information is available at the current stage of option development maturity to make an informed judgement on this evaluation measure. The criteria for achieving the objective are set out within the Water UK Public Interest Committee, the 2030 Net Zero Route map and SWS Net Zero Plan. The supporting evidence needed to validate against this criterion is not yet available for each of the options at this stage of design development.	The Carbon Strategic objective has been updated to "SW will deliver solutions in relation to design, construction and operation of the proposed development that are optimal in terms of Whole Life Carbon and reduce greenhouse gas emissions to as low as reasonably practicable having regard to the UK's climate change commitment of achieving net zero emissions by 2050". There is not enough evidence at this stage to suggest that there is any significant difference in the ability to reduce emissions between the SO and BUO, as they both have largely the same emissions sources and associated challenges to achieve this strategic objective.	Not enough information is available at the current stage of option development maturity to make an informed judgement on this evaluation measure. The criteria for achieving the objective are set out within the Water UK Public Interest Committee, the 2030 Net Zero Route map and SWS Net Zero Plan. The supporting evidence needed to validate against this criterion is not yet available for each of the options at this stage of design development.	The Carbon Strategic objective has been updated to "SW will deliver solutions in relation to design, construction and operation of the proposed development that are optimal in terms of Whole Life Carbon and reduce greenhouse gas emissions to as low as reasonably practicable having regard to the UK's climate change commitment of achieving net zero emissions by 2050". There is not enough evidence at this stage to suggest that there is any significant difference in the ability to reduce emissions between the SO and BUO, as they both have largely the same emissions sources and associated challenges to achieve this strategic objective.
	Adaptability	Option B.4 is considered to have the highest potential for evolvability and as an enabler for future projects that have the potential to jointly meet SW and PW's future demands. Option B.4 has the capability to be evolved to meet the highest perceived future need of 95MI/d for this asset by 2040. In addition, it has the potential to be evolved further should there be any increased need beyond 2040, through the increasing the capacity of the associated WRP which is possible due to the ample supply of final effluent available from Peel Common and Budds Farm wastewater treatment works. Option B.4 was observed as being fairly innovative, relative to current UK infrastructure, as it would be a novel use of a Water Recycling Plant in conjunction with the first reservoir to be constructed in the South East for 30-years.	Option B.4 is considered to have the highest potential for evolvability and as an enabler for future projects that have the potential to jointly meet SW and PW's future demands. Option B.4 has the capability to be evolved to meet the perceived future needs as outlined in SWS's emerging WRMP24. In addition, it has the potential to be evolved further, due to its integration with Portsmouth Water's Havant Thicket Reservoir (HTR), should there be any increased need in the future, and through increasing the capacity of the associated WRP which is possible due to the ample supply of final effluent available from other wastewater treatment works or potential desalination works. Option B.4 was observed as being fairly innovative, relative to current UK infrastructure, as it would be a novel use of a Water Recycling Plant in conjunction with the first reservoir to be constructed in the South East for 30-years.	The adaptability of this option is considered good as it can potentially be combined in a number of configurations. Option B.5 can be scaled to achieve the maximum required capacity of the future needs (95MI/d). Scaling capacity beyond this point is not possible owing to the fact that the necessary final effluent feed from Budds Farm and Peel Common WTW would be exhausted. Additionally, Environmental Buffer Lake at Otterbourne also represents a limitation to future capacity expansion in that it would also require enlarging to facilitate a minimum 24 -hr storage capacity. Option B.5 does not perform as well as Option B.4 in the context of providing regional support. It is, in effect, a point-to-point asset and would be transferring water from the PW region to SW. As such, Option B.5 can be seen as a relatively SW centric option. Option B.5 would also result in a less optimised utilisation of the Havant Thicket reservoir as a regional asset, which negates its benefit as a relatively cheap source of water (as compared recycled water). Option B.5 was observed as being fairly innovative, relative to current UK infrastructure, as it would be novel use of a Water Recycling Plant.	The adaptability of this option is considered good as it can potentially be combined in a number of configurations. Option B.5 can be scaled to achieve the maximum required capacity of the future needs (90MI/d). Scaling capacity beyond this point is not possible owing to the fact that the necessary final effluent feed from Budds Farm and Peel Common WTW would be exhausted. Additionally, an Environmental Buffer Lake, along the route, also represents a limitation to future capacity expansion. Option B.5 does not perform as well as Option B.4 in the context of providing regional support. It is, in effect, a point-to-point asset and would be transferring water from the PW region to SW. As such, Option B.5 can be seen as a relatively SW centric option. Option B.5 would also result in a less optimised utilisation of the Havant Thicket reservoir as a regional asset, which negates its benefit as a relatively cheap source of water (as compared recycled water). Option B.5 was observed as being fairly innovative, relative to current UK infrastructure, as it would be novel use of a Water Recycling Plant.

8.5. Comparative Assessment of the SO and BUO

Summary assessment

The evaluators then made a comparative assessment of the SO and BUO in order to conclude whether or not the SO represents the preferred solution for meeting the updated project requirements. A summary of the rankings of the SO and BUO for each of the business evaluation lenses is shown in Table 34.

Table 34: Ranking of SO and BUO across the business evaluation lenses, and overall

Options	Consenting Evaluation	MCDA ranking	Policy and Legal Obligations	Strategic Objectives			Overall Ranking
				Best Value	Net zero carbon	Adaptability	
SO	1	1	1	1	1	1	1
BUO	2	2	2	2	2	2	2

Business evaluation narrative

When considered from the perspective of meeting the requirements of WRMP24, including a 1-in-500-year drought, and assuming that all other parts of the programme deliver on target, the SO was considered preferable to the BUO, for the following reasons:

- The SO is considered to carry a lower overall consenting risk than the BUO;
- The SO has a significantly lower estimate of whole life cost than the BUO;
- The SO has a significantly lower whole life carbon impact than the BUO;
- The SO has marginally more positive overall NSI (Environment, Social, Customer, Deliverability impacts) than the BUO;
- The SO carries significantly lower technical deliverability risk than the BUO. In particular, the BUO might require significant further design changes to address technical feasibility challenges relating to the transfer of the required volume of raw effluent from Peel Common WTW and also the required capacity of the WRP;
- The SO is considered to provide greater resilience of supply since, unlike the BUO, in the event of a failure of the WRP, it could continue to supply raw water for a considerable period time; and
- The SO requires a shorter development and construction period than the BUO and therefore aligns better with the requirement to provide 'as little recourse as reasonably possible' to using Drought Orders and Drought Permits to maintain compliance with SW's supply obligations. As it is likely that, compared to the BUO, there would be less prolonged use of interim measures, it is less exposed to future cost inflation.

The key factors considered in the overall business evaluation of the SO and BUO, both in the Gate 2 OAP and the OAP review, are summarised in Table 35.

8.6. Conclusion

The SO performed significantly better than the BUO in each element of the OAP review appraisal and it is reasonable to conclude with a high level of confidence that it continues to represent the Best Value solution for meeting the updated project requirements.

Table 35: Summary of business evaluation for SO and BUO, Gate 2 and OAP review

SO		BUO	
Gate 2	OAP review	Gate 2	OAP review
<p>B.4 was considered to be the highest ranked option in the assessment based on the evidence of being consistently the second highest performer, behind D.2, within the components of the options appraisal. However, as the Supply Demand Balance (SDB) has increased (as per Annex 4), it was observed that D.2 is the only option which is unable to meet the higher deployable output (DO), as a consequence of a finite volume of water being held by the reservoir without the ability to 'top up'. D.2 could support an increased SDB in the short term due to its peak flow, however under the expected drought severity and duration, could not sustain this without the reservoir being refilled. D.2 could not (in its current design) be scaled to meet the increased requirement and would necessitate evolution to B.4 through the addition of a Water Recycling Plant.</p> <p>B.4 performed second best in the overall cost, as reflected in the MCDA Best Value rankings. It was expected that this would have a lower impact on customer bills than other remaining Options (B.5 and B.2).</p> <p>B.4 also ranked second highest within the consenting evaluation, highlighting a lower consenting risk than B.2 and B.5 due to not requiring the buffer lake at Otterbourne, which further removes a potential HRA risk associated with the overflow from the reservoir.</p> <p>Option B.4 can be adapted with ease to accommodate the revised SDB and future needs and is considered easier to adapt to satisfy regional needs (including those of PW) than other comparable options. This is due to the geographical location of the proposed assets, the means by which it is integrated with Havant Thicket reservoir and its significant potential for further capacity upgrades should this be required in the future. Furthermore, the future needs of PW could be readily addressed by adding a junction on the proposed pipe between the reservoir and Otterbourne treatment works.</p> <p>Option B.4 is also considered the most resilient option under consideration owing to the 'buffering' afforded by its integration with HTR, such that in the event that the WRP failed, raw water could still be transferred to Otterbourne WSW for a considerable period of time. By contrast, in the event that the WRP associated with Option B.5 failed, raw water would cease to flow to Otterbourne with immediate effect.</p>	<p>The only feasible options capable of meeting the project requirements are the SO (Evolved Option B.4) and BUO (Evolved Option B.5). It was confirmed that the reasons the remaining options considered in the Gate 2 OAP were not considered further remain valid. The SO and BUO were therefore the only options to be taken forward from the scoping stage for review and testing through the OAP review process.</p> <p>The SO consistently outperformed the BUO across all five Best Value Rankings that were considered, i.e. different combinations of sub-criteria in the MCDA used to provide alternative lenses.</p> <p>For whole life cost and overall affordability, i.e. also taking account of the likely costs of interim measures prior to it becoming operational, the gap in performance increased since the Gate 2 assessment. Whereas the BUO had slightly outperformed the SO in Net Social Impact in the Gate 2 OAP, i.e. across the remaining environmental, social, customer and deliverability criteria as a whole, the SO performed better than the BUO in the OAP review. As a result, the SO outperformed the BUO in every test of value of money that was undertaken using a range of alternative measures and weightings.</p> <p>The SO performed better than the BUO in the consenting risk reassessment. Consenting risks decreased for the SO since the gate 2 OAP but increased for the BUO.</p> <p>It is clear that the SO can accommodate the revised SDB and future needs identified in 2021. There are however some unresolved technical concerns about the ability of the BUO to accommodate these requirements.</p> <p>The SO continues to be assessed as more resilient than the BUO for the same reasons cited in the Gate 2 OAP, i.e. owing to the 'buffering' afforded by its integration with HTR, such that in the event that the WRP failed, raw water could still be transferred to Otterbourne WSW for a considerable period of time.</p>	<p>B.5 was observed as being the second highest ranked option, behind B.4, due to its higher cost and lower adaptability evaluation. Furthermore, this option is not considered as resilient as B.4 and nor does it provide any regional support.</p> <p>B.5 was observed to have ranked very similarly to B.2, which was expected, as they have a very similar design (B.5 being slightly larger), however given the increased SDB and a greater DO required from the SRO option, then B.5 would be the Preferred Option to B.2; still behind B.4.</p> <p>B.2 and B.5 had the joint longest duration for Delivery (Q4 2030), which would result in necessary extended duration of interim measures from 2027 (Section 20 deadline) which in turn would drive additional cost, which may then be passed on to customers.</p>	<p>The only feasible options capable of meeting the project requirements are the SO (Evolved Option B.4) and BUO (Evolved Option B.5). It was confirmed that the reasons the remaining options considered in the Gate 2 OAP were not considered further remain valid. The SO and BUO were therefore the only options to be taken forward from the scoping stage for review and testing through the OAP review process.</p> <p>The BUO consistently under-performed the SO across all five Best Value Rankings that were considered, i.e. different combinations of sub-criteria in the MCDA used to provide alternative lenses.</p> <p>For whole life cost and overall affordability, i.e. also taking account of the likely costs of interim measures prior to it becoming operational, the gap in performance increased since the Gate 2 assessment. Whereas the BUO had slightly outperformed the SO in terms of Net Social Impact in the Gate 2 OAP, i.e. across the remaining environmental, social, customer and deliverability criteria as a whole, it under-performed the SO in the OAP review. As a result, the BUO under-performed the SO in every test of value of money that was undertaken using a range of alternative measures and weightings.</p> <p>The BUO performed worse than the SO in the consenting risk reassessment. Consenting risks increased for the BUO since the Gate 2 OAP but decreased for the SO.</p> <p>There are some unresolved technical concerns about the ability of the BUO to accommodate the revised SDB and future needs identified in 2021. On the other hand, it is clear that the SO can accommodate these requirements.</p> <p>The BUO continues to be assessed as less resilient than the SO for the same reasons cited in the Gate 2 OAP, i.e. there would be no alternative means of supplying raw water to Otterbourne WSW in the event that the WRP failed, whereas the 'buffering' afforded by the integration with HTR with the SO, would enable raw water to continue to be supplied for a considerable period of time.</p>

Appendix 1: Overview of Gate 2 Option Appraisal Process

The Gate 2 OAP was developed and implemented in two phases:

- The initial phase was reported in an 'Interim Update' that SWS provided to RAPID in September 2021;
- The second phase was reported in SWS's Gate 2 'Future Needs Update' submitted to RAPID in December 2021.

This approach reflected the need to respond to changes in the requirements of the SRO that emerged within the period in which the Gate 2 submission was being prepared. The Options Appraisal Report that formed part of SWS's Gate 2 submission to RAPID in December 2021 set out nine stages in the Gate 2 OAP, as summarised in Table 36 below.

Table 36: Summary of the Gate 2 OAP elements

Step	Aims / purpose
(i) Site and route selection	To identify the most deliverable sites / routes for plant, pipelines, infrastructure / components, etc, for each of the shortlisted options.
(ii) Consenting appraisal	To assess the consenting risk of each option, with qualitative ranking.
(iii) Multi-criteria decision analysis (MCDA)	To assess and rank option performance against agreed best value themes & criteria, with extensive scenario and sensitivity testing.
(iv) Assessment against legal & policy obligations	To provide a RAG assessment and supporting commentary against each of the legal obligations and Government policy objectives (informed by the MCDA and consenting appraisal).
(v) Assessment against Strategic Objectives	To provide a RAG assessment and supporting commentary against each of the Strategic Objectives (informed by the MCDA and consenting appraisal).
(vi) Interim business evaluation (including an 'initial option appraisal')	To collate results and provide commentary and narrative supporting the basis for the initial evaluation in relation to each Option.
(vii) Future needs assessment	To develop outline option evolution plans for each of four remaining options to account for emerging WRSE results, ability to meet the deficit in a 1 in 500-year drought event, and further potential abstraction reductions.
(viii) Final business evaluation (including the 'final option appraisal')	To incorporate the findings of the future needs assessment in the overall evaluation through sensitivity testing of the two remaining 'evolved' Options (B.4 and B.5).
(ix) Decision recommendation	To provide collated commentary and narrative of the justification, reasoning and supporting basis for the evaluation in relation to each option; final Best Value Rankings of the options; and a formal decision of SWS's strategic option (SO) and Back up option (BUO) for recommendation at Gate 2.

Each of these stages contained a process with clear inputs and outputs and they all contributed to the final outcome of the Gate 2 OAP. A diagram showing the sequencing of stages and summarising cross-dependencies between them is shown in Figure 6.

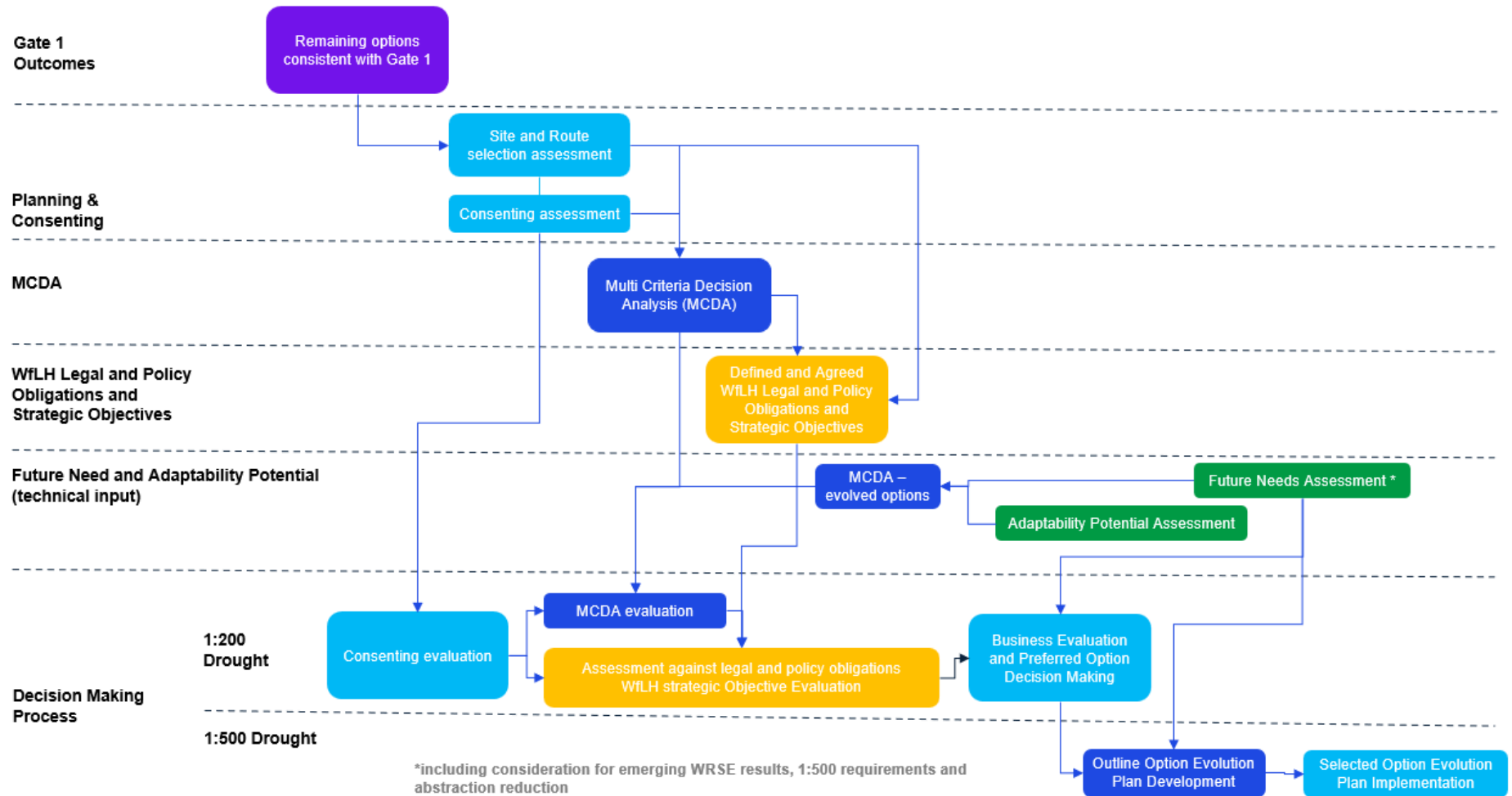


Figure 6: Overview of Gate 2 Options Appraisal Process

Appendix 2A: Review of alternative technologies

Options based on technologies other than water recycling and transfer were considered in the Gate 2 OAP but not progressed. In particular, desalination options were discounted during the options assessment process at Gate 2, on the grounds that they were not considered consentable at that time and place. They also performed worse overall than the other four options in the value for money assessment.

A high-level technical review of developments in alternative technologies was undertaken by SWS to support the OAP review. A workshop was held to consider whether there had been any significant developments in the period following the Gate 2 OAP that could challenge the grounds on which earlier decisions not to continue were made. This was attended by senior SWS engineering SMEs.

The participants confirmed that the only alternative technology that could in principle provide an additional feasible option was desalination.

The reasons for rejecting desalination options during the Gate 2 OAP were reconsidered.

Technology factors that have worsened or not changed since the decision not to progress desalination options was made were identified. In summary:

- There is a long-term industry supply shortage of Reg. 31 reverse osmosis membranes;
- The feed pressure required for a reverse osmosis (RO) unit in a desalination application is five times greater than that needed in a water recycling application, which has significant implications for both whole life cost and carbon impacts;
- Furthermore, the rate of recovery for desalination is significantly lower for desalination (45-55%) than for water recycling (75-82%);
- The EA's introduction of a stricter environmental quality standard (EQS) for compounds since Gate 2 worsens the case for desalination-based options further.

Project specific factors that have not changed:

- Location of desalination works - high concentrated flows of reject discharge – marine ecology study;
- The need for a pipeline to Testwood WSW;
- Disruptive tankering of chemicals.

Overall, it was concluded that there have been no changes in technology or project-specific factors that could support a change in the conclusion that desalination options are unconsentable at the current time, in this location.

Appendix 2B: Post-Gate 2 Development of BUO

Further feasibility work was undertaken on the BUO following Gate 2, culminating in a technical appraisal published in June 2022.²⁴ Key features of the outline concept included:

- Combining final effluent (FE) from Peel Common WTW and Budds Farm WTW at Budd's Farm;
- Sending treated flows to Otterbourne WSW (90 MI/d) via an environmental buffer lake (EBL);
- Increased capacity of the EBL, from ~70MI to ~700MI to provide a higher resilience requirement

The appraisal highlighted several issues requiring resolution:

- Ensuring that the reject stream from the WRP discharged via the Eastney long-sea outfall would not compromise existing consent conditions in the receiving water
- Identifying a suitable EBL site (or sites) that satisfied Reservoir Act requirements and would not compromise wider environmental considerations.
- Inclusion of an additional 26MI buffer tank at the WRP site to accommodate the impact of diurnal flows
- Improved understanding of the impact of groundwater and saline intrusion and establishing that sufficient raw water (from FE) would exist to feed the WRP during drought conditions

In addition, the longer pipelines to transfer FE from Peel Common to Budds Farm would increase costs and environmental risks. It was found that the estimated capex was ~20% higher than the SO, and estimated opex and carbon impacts were also higher. The BUO would also have a longer delivery schedule and provide a less flexible solution than the SO. While technically feasible, the BUO would present a significantly more complex delivery challenge than the SO.

Gate 3 Interim Update

The Gate 3 Interim Update (May 2023) reported that work to develop items unique to the BUO had been paused. This decision was based on the risk to the delivery of the HWTWRP having decreased significantly following funding approval for HTR and a construction contract being awarded.²⁵

Alternative BUO concepts

As part of the OAP review exercise SWS has explored whether a better-performing BUO could be identified, focusing on mitigating:

- Waste flow combination issues;
- Stresses caused by the predictable 24-hour cycle of water usage through diurnal flow buffering, and
- Risks of long-distance FE transfers.

The concept involved treating FE separately at Budds Farm (60 MI/d) and Peel Common (44 MI/d), then transferring recycled water directly to the EBL. While this approach addressed some issues, it did not resolve groundwater and saline intrusion concerns and remained inferior to HWTWRP in key respects:

- Although the HTR connection could be removed, the cost would be higher than for the SO since the Budds Farm WRP and transfer would still be required, along with the additional EBL, Peel Common WRP and ~15km transfer to the EBL;

²⁴ "Option B.5 Evolution Review Report_1.0," June 2022.

²⁵ The fundamental difference between the SO and BUO is the storage solution, with HWTWRP building on the strategic value of HTR, and the BUO dependent on the creation of a new EBL.

- Opex would be higher, as the WRPs would need to treat a full 90MI/d of recycled water between them and would not benefit from the additional flows from Bedhampton Springs that would be captured in Havant Thicket Reservoir (over and above flows that could be supplied to the Gater's Mill Connection);
- Resilience, while better than the Evolved Option B.5, would still be lower than HWTWRP owing to reliance on the WRPs remaining operational, rather than the reservoir and transfer pumps within HWTWRP.

A larger WRP at Peel Common or an intermediate site would not overcome these limitations.

Conclusion

In light of the above considerations, it was clear that no superior alternative to Evolved B.5 is currently available, and that no conceptual solution could be identified that outperformed HWTWRP. On this basis, it was agreed by SWS that, for the purposes of the OAP review, Evolved Option B.5 should be the comparator against which the performance of HWTWRP is considered.

Appendix 3: Details of approach to reviewing the assessment factors

Approach

The scoping framework was designed to capture the following information in relation to each assessment factor:

- 1) An assessment of changes since Gate 2 that may influence the factor's materiality. These changes fall into three broad categories:
 - i. Contextual changes – as noted above, some types of contextual change may affect the assessment criteria against which the options are appraised, e.g. updated environmental rules that change how noise or biodiversity is considered, carbon values, carbon sequestration rates, and so on;
 - ii. Changes to the scheme itself – such as design updates that affect the outcome (e.g. a larger footprint that increases land or habitat impacts); and,
 - iii. Local planning changes that could affect how options perform against the assessment criteria, such as new data or designations (e.g. a newly declared flood zone or air quality area).
- 2) A judgement as to whether the assessment factor is material to the OAP review and therefore 'in-scope', with a short explanation of the reasons.

How materiality was determined

Professional judgement was used to determine which assessment factors should be in-scope. This was informed by the assessment approach used in the Gate 2 OAP and the nature and scale of changes since then that might affect the outcome. To support consistency, the following questions were used as prompts:

- Was the factor used to compare or filter options?
- Did it influence the choice of preferred or Backup options?
- Was it given more weight than other factors?
- Was it tested under different scenarios or assumptions?
- Would changing or removing it have affected the outcome?
- Has new information emerged that could change its importance?

These questions were not answered one by one, but instead guided the explanation provided for each factor.

Identifying SMEs and the approach to the structured discussions

To ensure the review was robust and informed, SMEs were engaged across each of five assessment themes from within SWS and its consultant advisory teams. SMEs were selected on the basis of their topic-specific competence and qualifications. A structured discussion guide was prepared to facilitate the process and to capture initial summaries of the review sessions. However, the conclusions drawn from these discussions were validated by the participants and SWS is responsible for any decisions that are made that rely on them.

During the structured discussions, SMEs in each thematic area were asked to use their professional judgement to determine the nature and extent of relevant changes since the Gate 2 OAP was carried out in 2021. They were also asked to consider the materiality of the changes in order to help determine which of them should be considered 'potentially material' to the consenting risk assessment and the MCDA. To support appropriate and consistent judgement of which factors to consider and their materiality, the SMEs were provided with standard guidance, as follows:

“The purpose of the scoping phase [of the OAP review] is to assess changes that have occurred to the factors that supported the decision-making process within the [Gate 2] OAP process, and to consider whether they are material. A material change is defined as one that the SME judges believe could, either individually or in conjunction with other changes, result in one or more of the assessment and evaluation processes undertaken within the Gate 2 OAP producing different results or supporting different conclusions, were they to be repeated now.

SMEs should consider changes within their areas of expertise in relation to:

- Relevant industry or governmental / regulatory guidance, plans, policies and legal requirements;
- Scheme development and design;
- The local planning context with which the scheme will interact.”

A record of the organisation and area of expertise for each of the SMEs interviewed as part of the process for informing the scoping framework is shown in Table 37.

Table 37: SME details, grouped by theme

Theme	Organisation	Area of expertise
Environment	Arup	Waste
	Arup	Health
	Arup	Environment Lead
	Arup	Resources
	Arup	Socioeconomics and tourism
	Arup	Landscape and visual
	Arup	Land use
	Arup	Traffic and transport
	Arup	Major accidents & disasters
	SWS	Principal Environmental Advisor
	Haskoning	Water environment
	Haskoning	Land quality and ground conditions
	Haskoning	Carbon and climate change
	Haskoning	Archaeology and cultural heritage
	Haskoning	Air quality and odour
	Haskoning	Noise & vibration
	Mott Macdonald	Marine Biodiversity
	Mott Macdonald	Marine biodiversity
	Mott Macdonald	Terrestrial and freshwater biodiversity
	Mott Macdonald	Ecologist
Reading Agricultural Consultants	Agriculture	
Legal	Pinsent Mason	Legal Director
	Pinsent Mason	Senior Associate
	SWS	Infrastructure Solicitor Major Projects
Planning & Development	SWS	Planning & Consenting Lead
	Stantec	Environmental planner
	Stantec	Director, Planning team
Water resources	SWS	Strategic Supply and Demand Manager
	SWS	Prog. Manager for WRMP schemes
	SWS	Major Projects Technical Manager
	SWS	Water Resources Strategy Manager

A record of the interviews that were held, including the theme and date of each, is shown in Table 38.

Table 38: SME interviews by theme and date

Theme	Date
Environmental impacts (scoping)	16/7/25
Planning & Development	16/7/25
Water resources	17/7/25
Legal	21/7/25
<i>Environment interviews by topic area:</i>	
Water and marine biodiversity, BNG and water environment	29/07/2025
Archaeology, culture, agriculture, landscape	29/07/2025
Air quality, land use, noise, socio-econ, health, traffic	30/07/2025
Carbon, resources, major accidents, waste	29/07/2025
Major accidents and hazards	07/08/2025
Marine biodiversity	07/08/2025
Land quality & ground conditions	12/08/2025

Decision making workshop

The iterated framework was taken to a workshop held at SWS offices on 21st August 2025. A record of the workshop attendees is shown in Table 39.

Table 39: Workshop attendees (decision-makers and technical advisors)

Organisation	Role
SWS	Programme Manager HWTWRP
SWS	Senior Project Manager HWTWRP
SWS	Infrastructure Solicitor Major Projects
SWS	Major Projects Technical Manager
Stantec	Consenting advisor
Stantec	Consenting advisor
Pinsent Masons	Legal Director
Quod	Consenting advisor

The purpose of the workshop was to consider the findings of the scoping phase and agree the scope of factors to be considered in the review and testing phase, as set out in the following sections.

A record of the organisation and area of expertise for each of the SMEs interviewed as part of the process for informing the scoping framework is shown in Table 40.

Table 40: SME details, grouped by theme

Theme	Organisation	Area of expertise
Environment	Arup	Waste
	Arup	Health
	Arup	Environment Lead
	Arup	Resources
	Arup	Socioeconomics and tourism
	Arup	Landscape and visual
	Arup	Land use
	Arup	Traffic and transport
	Arup	Major accidents & disasters
	SWS	Principal Environmental Advisor
	Haskoning	Water environment
	Haskoning	Land quality and ground conditions
	Haskoning	Carbon and climate change
	Haskoning	Archaeology and cultural heritage
	Haskoning	Air quality and odour
	Haskoning	Noise & vibration
	Mott Macdonald	Marine Biodiversity
	Mott Macdonald	Marine biodiversity
	Mott Macdonald	Terrestrial and freshwater biodiversity
	Mott Macdonald	Ecologist
Reading Agricultural Consultants	Agriculture	
Legal	Pinsent Mason	Legal Director
	Pinsent Mason	Senior Associate
	SWS	Infrastructure Solicitor Major Projects
Planning & Development	SWS	Planning & Consenting Lead
	Stantec	Environmental planner
	Stantec	Director, Planning team
Water resources	SWS	Strategic Supply and Demand Manager
	SWS	Prog. Manager for WRMP schemes
	SWS	Major Projects Technical Manager
	SWS	Water Resources Strategy Manager

A record of the interviews that were held, including the theme and date of each, is shown in Table 41.

Table 41: SME interviews by theme and date

Theme	Date
Environmental impacts (scoping)	16/7/25
Planning & Development	16/7/25
Water resources	17/7/25
Legal	21/7/25
<i>Environment interviews by topic area:</i>	
Water and Marine Biodiversity, BNG and water environment	29/07/2025
Archaeology, culture, agriculture, landscape	29/07/2025
Air quality, land use, noise, socio-econ, health, traffic	30/07/2025
Carbon, Resources, Major Accidents, Waste	29/07/2025
Major Accidents and Hazards	07/08/2025
Marine Biodiversity	07/08/2025
Land Quality & Ground Conditions	12/08/2025

Appendix 4 Site and Route Selection Criteria

Environmental criteria are shown in Table 42.

Table 42: Environmental criteria

Evaluation Topic	Sub-criteria
Air Quality	Impact of dust emissions
	Impact of non-road mobile machinery (NRMM)
	Impact of vehicular emissions
	Impact of odour emissions
Biodiversity and Nature Conservation	Impact on internationally designated sites
	Impact on priority habitats
	Impact on nationally designated sites
	Protected species
	Regional and local designated sites
Carbon and Climate Change	Embodied carbon
	Other emissions (road transport, plant and equipment)
	Operational carbon emissions
	Climate adaptation and resilience
Geology and Soils	Impact on designated sites
	Risk of mobilisation of contaminants as a result of proximity to landfills, other contaminating industry etc.
Historic Environment	Impact on nationally important historic environment assets including scheduled monuments, grade I and II* listed buildings, grade I and II* registered park and gardens.
	Impact on regionally important historic environment assets
	Impact on areas of high archaeological potential and complexity
	Impact on buildings and other non-designated heritage assets of local interest
	Historic landscapes
Landscape and Visual Amenity	Impacts on nationally designated areas, National Landscapes, National Parks and Areas of Outstanding Natural Beauty (AONB)
	Impact on regional/county/local landscape designations
	Impacts on landscape/townscape character
	Impact on visual amenity
Noise and Vibration	Direct airborne noise
	Direct ground-borne noise impacts from tunnelling
	Direct vibration impacts
	Indirect noise impacts due to traffic
Resource and Waste Management	Waste generation (landfill)
	Impact on Mineral Safeguarding Areas and sterilisation of mineral resources
	Impact on Minerals and Waste Safeguarded Sites
Socio-economic Impact	Residential and commercial property
	Recreation, open space and tourism
	Community facilities

Evaluation Topic	Sub-criteria
	Population and health
Traffic and Transport	Impact on shipping and navigation
	Impact on marine vessel users
	Impact on road users (including bus)
	Impact on rail users
	Impact on airfields and airports
	Impact on pedestrians
	Impact on cyclists
Water quality and resources and flood risk	Impact on equestrians
	Impact on sediment and water quality in terrestrial waters
	Impact on watercourse geomorphology and hydrology
	Impact on groundwater bodies
	Impacts on water-dependent protected areas
	Impact on flood risk comprising fluvial flood risk, surface water flood risk (including surface water flow paths), groundwater flood risk and reservoir flood risk.

Engineering criteria are shown in Table 43.

Table 43: Engineering criteria

Evaluation Topic	Sub-criteria
Engineering	Constructability
	Hydraulics

Land and planning interface criteria are shown in Table 44.

Table 44: Land and planning criteria

Evaluation Topic	Sub-criteria
Interface with Other Development	Interface with existing development (not brownfield land)
	Interface with consented Nationally Significant Infrastructure Projects (NSIPs) NSIPs in the pre-application process
	Interface with development consented under the Town and Country Planning Act (TCPA) (other development)
	Interface with TCPA development applications.
	Interface with Minerals and Waste sites
	Interface with strategic land allocations (Strategic Housing Land Availability Assessment (SHLAA) / Strategic Housing and Economic Land Availability Assessment (SHELAA))
	Interface with Minerals and Waste allocations
	Interface with neighbourhood plan policy specific areas – housing/ employment sites
Special Category Land	Impact on Crown Land
	Impact on Statutory Undertaker Land
	Impact on Open Space
	Impact on National Trust Land
	Impact on common land

Appendix 5: Gate 2 OAP Consenting evaluation scores

Table 45 shows all the criteria and sub-criteria considered in the OAP consenting risk evaluation at Gate 2 (both in- and out-of-scope of the OAP review), together with the RAG scores.

Table 45: Gate 2 OAP consenting evaluation scores

#	Assessment factors		Gate 2 OAP RAG rating					
	Criterion	Sub-criteria	Evolved Option B.4	Evolved Option B.5				
1	Air quality & emissions	Dust	Construction	Minor adverse impact	Minor adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carry over.		
		Vehicular emissions						
		Odour	Operations	No impact	No impact		Out of scope of backcheck - Gate 2 RAG ratings carried over	
2	Biodiversity & Nature Conservation Terrestrial - HRA	SAC, SPA, Ramsar sites & all potential, possible & candidate sites	Construction	Large adverse impact	Large adverse impact			
		Functionally linked habitat	Operations	Moderate adverse impact	Moderate adverse impact			
3	Biodiversity & Nature Conservation Terrestrial	Nationally designated sites	Construction	Large adverse impact	Large adverse impact			
		Impact on priority habitats						
		Ancient woodland & veteran trees	Operations	Minor adverse impact	Large adverse impact			
4	Biodiversity & Nature Conservation – Marine - HRA	SAC, SPA, Ramsar sites & all potential, possible & candidate sites	Construction	Moderate adverse impact	Moderate adverse impact			
		Functionally linked habitat	Operations	Moderate adverse impact	Moderate adverse impact			
5	Biodiversity & Nature Conservation – Marine	Nationally designated sites	Construction	Moderate adverse impact	Moderate adverse impact			
		Impact on priority habitats	Operations	Moderate adverse impact	Moderate adverse impact			
6	Carbon	Embodied carbon	Whole life	Moderate adverse impact	Moderate adverse impact			
		Carbon emissions (operations)						
7	Coastal change processes	Impact on coastal processes (erosion / deposition)	Construction	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
			Operations	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
8	Geology & soils	Designated sites	Construction	Moderate adverse impact	Moderate adverse impact			
		Soil resource						
		Risk of mobilisation of contaminants				Operations	No impact	No impact
9	Historic environment - Terrestrial	Nationally & regionally important assets	Construction	Moderate adverse impact	Moderate adverse impact			
		Unknown archaeology (impact on areas of archaeological potential)	Operations	Minor adverse impact	Minor adverse impact			
10	Historic environment - Marine	Nationally & regionally important assets	Construction	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Unknown archaeology (impact on areas of archaeological potential)	Operations	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
11	Landscape / Seascape and Townscape and Visual Amenity	Nationally & regionally important assets	Construction	Large adverse impact	Large adverse impact			
		Visual amenity	Operations	Minor adverse impact	Moderate adverse impact			
12	Major accidents & disasters	Risks associated with existing facilities	Construction	Minor adverse impact	Moderate adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Risks associated with the operation of the plant itself	Operations	Minor adverse impact	Moderate adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
13	Noise & vibration		Construction	Minor adverse impact	Minor adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
			Operations	Minor adverse impact	Minor adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
14	Resource & waste management	Waste generation	Construction	Minor adverse impact	Minor adverse impact			
		Waste facilities / infrastructure						
		Impact on Mineral Safeguarding Areas				Operations	No impact	No impact
		Proximity to licensed dredging, disposal and extraction areas						
15	Socio-economic impact	Impacts on Public Rights of Way and recreational facilities	Construction	Moderate adverse impact	Moderate adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Impact on community facilities						
		Impact on marine recreation	Operations	Minor adverse impact	Minor adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Impact on commercial fisheries						
		Impact on licensing areas						
16	Traffic & transport	Impact on shipping and navigation	Construction	Moderate adverse impact	Moderate adverse impact			
		Impact on marine vessel users						
		Impact on road and rail network	Operations	Minor adverse impact	Minor adverse impact			
		Impact on road users						
17	Water quality & resources	Impact on marine water quality	Construction	Moderate adverse impact	Moderate adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Impact on terrestrial water quality	Operations	Moderate adverse impact	Moderate adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Impact on watercourse geomorphology & hydrology						
18	Flood risk	Impact on flood risk	Construction	Moderate adverse impact	Moderate adverse impact			
		Impact on flood defences	Operations	No impact	No impact			
19	Interface with Future Development & Planning	Risks assoc. with exiting / future NSIPs	Construction	Moderate adverse impact	Moderate adverse impact			
		Risks assoc. with 'other' development						
		Risks associated with compromising future marine development				Operations	No impact	No impact
		Development plan risk						
20	Land Use (Special Category Land)	Impact on Special Categories of Land	Construction	Moderate adverse impact	Moderate adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
			Operations	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
21	Green Belt	Impact on Green Belt	Construction	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
			Operations	No impact	No impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
22	Technology & compliance with regulatory approvals	Technological viability		Minor adverse impact	Minor adverse impact	Out of scope of backcheck - Gate 2 RAG ratings carried over		
		Ability to secure necessary regulatory permits & licences						
23	Constructability	Construction risks		Moderate adverse impact	Moderate adverse impact			
		Construction timescales						
		Interfaces with utilities						
		Topography challenges						
24	Resilience	Likely resilience of the solution		Minor adverse impact	Minor adverse impact			
		Self-sufficiency of the solution						
25	Cost	Capital cost	Whole life	Moderate adverse impact	Moderate adverse impact			
		Operational cost						

Appendix 6: Summary of methods used to update the MCDA inputs

Table 46 shows the sources and methods of inputs to the MCDA at gate 2 and in the OAP review.

Table 46: Summary of methods used in the OAP review to update the MCDA inputs

Theme	MCDA sub-criterion		Impact		Gate 2 inputs	Source of updated inputs		
			Measure	Unit		SO	BUO	
Affordability	A.01	Whole Life Cost	Monetised	£	WLC workstream	RAPID Gate 3 capex and opex estimates	Capex and opex estimates for BUO provided by SWS Cost Intelligence Team (CIT)	
Environment	E.08	Embodied & operational carbon	Monetised	£	Carbon workstream	RAPID Gate 3 construction / operational carbon estimates	Embodied & operational carbon estimates for BUO provided by SWS Carbon team	
	E.13	Landscape & Townscape impacts	Qualitative	RAG scores	Consenting risk analysis (Stantec)	Gate 2 inputs were derived from analysis undertaken by Stantec. The methodology and scores for the SO and BUO were reviewed and updated in SME workshops attended by SWS consenting risk lead and SWS technical advisors, held on 4/12/25 and 12/12/25.		
	E.14	Flood risk impacts						
Society	S.02	Historic Environment (terrestrial)						
Environment	E.01	Biodiversity Net Gain	Quantitative	BNG units	BNG / Biodiversity & Habitats / NCA workstream (Ricardo)	Workshops attended by BNG/ENG SMEs on 11/11/25 & 20/11/25. For the BUO, it wasn't possible to qualitatively estimate the changes in hectareage by habitat type necessary to inform (a) an updated estimate of BNG units and (b) updated estimates of monetised NC assessments that rely on hectareage changes by habitat type. Agreed to update the monetised impacts by (a) assuming the same hectareage changes as at Gate 2 for the SO & BUO and (b) applying updated external values (carbon price, sequestration rates etc) which are changes that are within the scope of the OAP review. It was agreed that the input uncertainty associated with the hectareage changes would be addressed through additional sensitivity testing.		
	E.03	Climate regulation						
	E.04	Natural hazard regulation						
	E.07	Food production						
Society	S.01	Recreation & amenity	Monetised	£			Considered in the same workshop as the natural capital sub-criteria. Similarly, it wasn't possible to qualitatively estimate the change in the key driver of impact, in this case the impact of the BUO on footpaths (sensitive receptors). Agreed to update the impacts by (a) assuming the same sensitive receptors as at Gate 2 for the SO & BUO and (b) applying updated external parameters and values. Workshop held with SWS technical experts and advisors on BNG/ENG on 11/11/25. Owing to unavailability of information on sensitive receptors for BUO, it was agreed to carry forward RAPID Gate 2 inputs for SO & BUO.	
Environment	E.06	Water purification	Qualitative	RAG scores			Meeting held with SWS engineering SME to update the option components (4/12/25) and workshop attended by SWS technical advisors held (17/12/25) to rescore impacts on water purification NC services.	
	E.02	Habitat & Biodiversity (HRA)					Workshop attended by BNG/ENG SMEs on 11/11/25. Lack of detailed information on the BUO noted. Drawing on the outputs of the consenting evaluation, it was agreed to carry forward the RAPID Gate 2 scores.	
Customer	C.01	Tap Water Quality	Qualitative	RAG rating			SME 'consensus workshops'	SME workshop on 16/10/25, attended by relevant SWS engineering and technical leads to review / rescore the RAG ratings for the SO and BUO, drawing on the Gate 2 methodology and scoring.
	C.02	Resilience of Supply						
Delivery	D.01	Supply chain capacity						
Environment	E12	Water abstraction						
Affordability	A.03	Cost of interim measures						

Appendix 7A: Capital cost estimates

The OAP review MCDA assessment was informed by updated capital cost (capex) estimates produced at Gate 3A for the SO, and the outputs of a bespoke cost assessment undertaken for the purposes of the OAP review by the SWS Cost Intelligence Team for the BUO. A breakdown of the updated capital cost estimates for the SO and BUO is shown in Table 47.

Table 47: Breakdown of updated capex estimates, SO and BUO

Bill Description	B5 Gate 2 Update 1 Base Oct - 21	B5 Indexed to Q3 - 22	B4 Gate 3A Q3 - 22	B5 Oct 25 Update Q3 - 22	Comments
OPTION B5_CAPEX ESTIMATE WRP_WORKS AT BUDDS FARM 629451-SWS-WO-BF-BQ-Z-00001	£ 150,000.00	£ 161,100.00	£ 4,824,112.00	£ 4,824,112.00	Updated to reflect current Budds Farm works value from B4 [3A] (No change from B4 Scope & Values)
TUNNELS BUDDS FARM TO WRP SITE 72 & RETURN	£ 20,306,814.06	£ 21,809,518.30	£ 23,855,354.00	£ 23,855,354.00	Updated to reflect pipejack and shaft costs from B4 [3A] (No change from B4 Scope & Values)
B5_WATER RECYCLING_PEEL COMMON WTW TO WRP ROUTE 1 629451-SWS-ZZ-ZZ-BQ-C-00004	£ 23,796,961.25	£ 25,557,936.38	N/A	£ 61,414,062.94	Updated from B5 Gate 2 Update 1 peel common pipeline and primary PS now reflecting learning from T2ST CP2 includes current insight & methodology including 40m wide full stoned up easement and access roads, hard wired communication cables throughout, 15% uplift for subcontract indirect costs and revised trenchless constructability information deployed on both T2ST & HWTWRP preferred options "Re the 25km pipeline, as this is very limit in its design / risk understanding. To mitigate we will inflate OB by 40% risk (based on 66% OB less OB applied to the based cost of 26%)" JR [See line 74] Easement & Haul Road + £11.3m Sub Contract Elements + £4.0m Trenchless Crossings + £9.4m Material Costs, Change to depths & Hard Wired Comms + £11.1m
WRP 75MLD- NON INFRASTRUCTURE CAPEX	£ 119,471,689.92	£ 128,312,594.97	£ 147,726,500.00	£ 201,972,582.33	As Per B4 gate 3A (60 MLD) Updated to 90 MLD) "On the 30 M/d increase in the WRP again, as this is very limit in its design / risk understanding. To mitigate we will inflate OB by 40% (based on 66% OB less OB applied to the based cost of 26%)" JR [See Line 75] Moving of EBL and Peel Common PS - £15.8m Sub Contract Elements + £23.4m Uplift to MF, RO, UV, Dosing, GAC & Pumping + £30.2m Site Wide Civils including Piling, Green Roof Tech, Larger Buildings + £35.8m

Bill Description	B5 Gate 2 Update 1 Base Oct - 21	B5 Indexed to Q3 - 22	B4 Gate 3A Q3 - 22	B5 Oct 25 Update Q3 - 22	Comments
B5/B2_WATER RECYCLING_WRP TO OTTERBOURNE WSW (ENV BUFFER) ROUTE SIA BASE 629451-SWS-WO-ZZ-BQ-C-00005	£ 64,665,487.45	£ 69,450,733.52	£ 109,187,113.00	£ 130,140,547.00	As per B4 gate 3A for open cut pipeline to Otterbourne (£109m) with Updated EBL (£21m) including changes to capacity and anti floatation measures "The EBL needs to be a base cost of 90 MI/d, but the risk is it could be 90 x 7days (operational capacity) plus say 10% for the bottom volume = rounded to 700MI, increase of 610MI." JR [See Line 71] Easement & Haul Road + £17.7m Sub Contract Elements + £8.9m Trenchless Crossings + £5.9m Material Costs & Hard Wired Comms + £7.1m EBL + £21.0m
WRP 72 TO PURBROOK TUNNEL 710166-SWS-ZZ-ZZ-BQ-C-00010	N/A	N/A	£ 126,749,074.74	£ 126,749,074.74	Purbrook Tunnel cost from option B4 3A Not scoped in B5 (No change from B4 Scope & Values)
ITCHEN CROSSING PIPE JACK 710166-SWS-ZZ-ZZ-BQ-C-00010	N/A	N/A	£ 27,700,611.82	£ 27,700,611.82	Itchen Crossing Pipejack from B4 3A Not scoped in B5 (No change from B4 Scope & Values)
629451-SWS-ZZ-ZZ-BQ-C-00010 B5_WATER RECYCLING_PEEL COMMON WTW TO WRP ROUTE 1 - 2ND PUMPING STATION 4 X 355KW HIGH LIFT PUMPS	£ 3,484,034.05	£ 3,741,852.57	N/A	£ 4,006,639.00	Updated from B5 Gate 2 Update 1 intermediate pumping on peel common pipeline adjusted inclusion of sub contract prelims only (15%)
629451-SWS-WO-ZZ-BQ-C-00008 B5_B2_WATER RECYCLING_WRP TO OTTERBOURNE WSW (ENV BUFFER) ROUTE SIA - 2ND PUMPING STATION 4 X 280KW HIGH LIFT PUMPS	£ 4,136,247.36	£ 4,442,329.66	£ 12,313,191.67	£ 12,313,191.67	As per B4 gate 3A pumping components for AGP's on Otterbourne pipeline (No change from B4 Scope & Values)
629451-SWS-ZZ-ZZ-BQ-C-00006 BPT - TYPICAL OTTERBOURNE	£ 2,707,260.42	£ 2,907,597.69	£ 13,227,087.58	£ 13,227,087.58	As per B4 gate 3A break pressure tank components for AGP's on Otterbourne pipeline (No change from B4 Scope & Values)
710166-SWS-ZZ-ZZ-BQ-C-00010 - WRP TO BHS PIPE JACK			£ 22,207,877.00	N/A	Not Required for B5 Scope
710166-SWS-ZZ-ZZ-BQ-C-00009 - CONNECTIONS TO BHS			£ 2,070,376.00	N/A	Not Required for B5 Scope
			£M	£M	
Direct Works Total	£ 238,718,494.51	£ 256,383,663.10	£ 490	£ 606	

Indirect Costs	Component Cost B4	Percentage of B4 Base	Same Percentage B5 Base	Comments
Access & Accomodation Works	£ 5.6	1.1%	£ 6.9	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Allowance for Implementation of Environmental Mitigation, BNG and Species Relocation	£ 13.5	2.7%	£ 16.7	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
System Testing	£ 16.3	3.3%	£ 20.2	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Contractors Design	£ 35.0	7.1%	£ 43.3	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Archaeological and UXO Site Surveys and Reporting	£ 5.7	1.2%	£ 7.0	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Contractors Staffing	£ 45.5	9.3%	£ 56.3	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Compounds and Access Roads	£ 48.9	10.0%	£ 60.6	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Yard Accomodation, Services, Yard Operations, Medical and Catering Facilities Fuel & Transport	£ 50.8	10.4%	£ 62.9	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Staff Subsistence	£ 26.9	5.5%	£ 33.3	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Contractors Collateral Warrantees and Parent Company Guarantees	£ 2.2	0.5%	£ 2.8	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Contractors OHP at 12.5%	£ 92.6		£ 114.5	Based upon an assumed Contractors OHP of 12.5% on everything above
Allowance for CAP operating costs from Financial Close to WIS	£ 45.2	9.2%	£ 55.9	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Allowance for Insurances	£ 24.8	5.1%	£ 30.7	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Allowance for 2 x Unsuccessful Bidder Costs	£ 10.0		£ 10.0	Aligned to B4 Gate 3A Allowance
Allowance for CAP Tendering Costs	£ 15.0		£ 15.0	Aligned to B4 Gate 3A Allowance
Total Construction Estimate	£ 928.0		£ 1,142.5	£ 0.88

Indirect Costs	Component Cost B4	Percentage of B4 Base	Same Percentage B5 Base	Comments
Southern Water Development Costs to Date (March 25)	£ 89.0	18.2%	£ 110.1	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Southern Water Forecast Development Costs April 25 to Financial Close in 2029	£ 91.0	18.6%	£ 112.6	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Southern Water Forecast Development Costs 2030 to WIS (2034)	£ 39.1	8.0%	£ 48.3	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Total Southern Water Development Cost Forecast in Q3 22	£ 219.0		£ 271.0	£ 0.44711
Estimate Total in Q3 22	£ 1,147.1		£ 1,413.5	
Risk from Version V12 of the Risk Register in Q3 22	£ 102.7	21.0%	£ 127.1	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
EBL risk			£ 305.5	See comment on line 16 - Uplifted by factor of 1.62 to allow for prelims and OH to manage if the risk is realised as per B4 risk register
Optimism Bias at 26.2%	£ 310.304		£ 382.4	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Peel Common Pipeline Enhanced OB at 40%			£ 32.3	OB uplift of 40% (delta between 66% max and 26% project wide) as allowance for unknown threats relating to peel common main
90 MLD Enhanced OB at 40%			£ 80.8	OB uplift of 40% (delta between 66% max and 26% project wide) as allowance for unknown threats relating to 90 MLD WRP
Total Contingency Value	£ 413.0		£ 928.0	
Forecast Cost for Land Rental and Compensation	£ 8.98	1.8%	£ 11.113	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Forecast Cost for DNO Supply	£ 28.2	5.8%	£ 34.894	Applied at the same percentage uplift to direct works cost as B4 Gate 3A (Noting that B4 Gate 3A was derived from 1st principles)
Estimate Total	£ 1,597.2		£ 2,387.5	
AACE 69r-12 - CLASS 5 Assessed Confidence Range Lower and Upper Values for Costed Scope only		+75%	£ 4,178.2	
		-15%	£ 2,029.4	

Compares Current Option B4 at Gate 3A October 2025 with Evolved Option B5 from Gate 2
This views what B5 would be with the benefit of current knowledge that has been applied to B4

1.074	CPIH
	As per current B4 estimate
	Gate 2 B5 estimate updated with current learning
	As per current B4 estimate updated to comply with B5 scope (90 MLD WRP & EBL etc)

Appendix 7B: OPEX, NPV and AIC estimates

The OAP review MCDA assessment was informed by updated operating cost (opex) estimates produced at Gate 3A for the SO, and the outputs of a bespoke cost assessment undertaken for the purposes of the OAP review by the SWS Cost Intelligence Team for the BUO. A breakdown of these estimates is shown in Table 48.

Table 48: Breakdown of updated opex estimates, SO and BUO

Option			B5 Gate 2 Update 1			B4 Gate 3A			Comments
Component			WRP	Transfer	Total	WRP	Transfer	Total	
Flows (ML/d)			90	90		60	90		
Costs	Type	Units							
Labour	Fixed	£k/y	595	0	595	595	0	595	Based on several types of labour and FTE requirements. Transfer labour included within WRP labour.
Operational maintenance	Fixed	£k/y	1,818	1,390	3,208	1,569	1,082	2,651	Based on % of initial capex
Chemicals	Variable	£k/y	5,598	0	5,598	3,786	0	3,786	Total for multiple chemicals
Power consumed	Fixed	£k/y	1,803	356	2,159	1,232	356	1,588	Based on 22.11p/kWh
Power consumed	Variable	£k/y	11,496	9,124	20,620	7,856	9,124	16,980	Based on 22.11p/kWh
Total	All	£k/y	21,310	10,870	32,180	15,037	10,562	25,599	
NPV - Finance		£k	645,965	1,320,412	1,966,377	611,220	735,861	1,347,081	Derived using max DO, total 80yr period
NPV - Opex		£k	416,553	225,675	642,228	300,292	210,517	510,809	Derived using max DO, total 80yr period
NPV - WAFU		m3	655,605,447	655,605,447	655,605,447	437,070,298	655,605,447	437,070,298	Derived using max DO, total 80yr period
AIC		p/m3	162	236	398	209	144	353	Derived using max DO, total 80yr period

Appendix 7C: Embedded carbon estimates

The OAP review MCDA assessment was informed by updated embedded carbon estimates produced at Gate 3A for the SO, and the outputs of a bespoke assessment undertaken for the purposes of the OAP review by the SWS Cost Intelligence Team and Carbon Team for the BUO. A breakdown of these estimates is shown in Table 49.

Table 49: Breakdown of updated embedded carbon estimates, SO and BUO

Bill Description	B5 Gate 2 Update 1 (tCO2e)	B4 Gate 3A (tCO2e)	Comments
OPTION B5_CAPEX ESTIMATE WRP_WORKS AT BUDDS FARM 629451-SWS-WO-BF-BQ-Z-00001	1,179	1,179	Updated to reflect current Budds Farm works scope from B4 [3A] (No change from B4 Scope & Values)
TUNNELS BUDDS FARM TO WRP SITE 72 & RETURN	5,831	5,831	No change from B4 Scope & Values
B5_WATER RECYCLING_PEEL COMMON WTW TO WRP ROUTE 1 629451-SWS-ZZ-ZZ-BQ-C-00004	25,235	0	Updated from B5 Gate 2 Update 1 peel common pipeline and primary PS now reflecting learning from T2ST CP2 includes current insight & methodology including 40m wide full stoned up easement and access roads, hard wired communication cables throughout.
WRP 75MLD- NON INFRASTRUCTURE CAPEX	31,051	22,738	As Per B4 gate 3A (60 MLD updated to 90 MLD)
B5/B2_WATER RECYCLING_WRP TO OTTERBOURNE WSW (ENV BUFFER) ROUTE SIA BASE 629451-SWS-WO-ZZ-BQ-C-00005	50,476	49,776	As per B4 gate 3A for open cut pipeline to Otterbourne with Updated EBL including changes to capacity and anti flotation measures.
WRP 72 TO PURBROOK TUNNEL 710166-SWS-ZZ-ZZ-BQ-C-00010	25,419	25,419	Purbrook Tunnel carbon cost from option B4 3A Not scoped in B5 (No change from B4 Scope & Values)
ITCHEN CROSSING PIPE JACK 710166-SWS-ZZ-ZZ-BQ-C-00010	6,349	6,349	Itchen Crossing Pipejack from B4 3A. Not scoped in B5 (No change from B4 Scope & Values)
629451-SWS-ZZ-ZZ-BQ-C-00010 B5_WATER RECYCLING_PEEL COMMON WTW TO WRP ROUTE 1 - 2ND PUMPING STATION 4 X 355KW HIGH LIFT PUMPS	0 including above	0 including above	Updated from B5 Gate 2 Update 1 intermediate pumping on Peel Common pipeline.
629451-SWS-WO-ZZ-BQ-C-00008 B5_B2_WATER RECYCLING_WRP TO OTTERBOURNE WSW (ENV BUFFER) ROUTE SIA - 2ND PUMPING STATION 4 X 280KW HIGH LIFT PUMPS	4,783	4,783	As per B4 gate 3A pumping components for AGPs on Otterbourne pipeline (No change from B4 Scope & Values)
629451-SWS-ZZ-ZZ-BQ-C-00006 BPT - TYPICAL OTTERBOURNE	2,685	2,685	As per B4 Gate 3A break pressure tank components for AGPs on Otterbourne pipeline (No change from B4 Scope & Values)
Total (excluding capital carbon risk allowance)	153,008	118,760	
Total (including capital carbon risk allowance)	191,259	148,450	

Compares Current Option B4 at Gate 3A October 2025 with Evolved Option B5 from Gate 2
This views what B5 would be with the benefit of current knowledge that has been applied to B4

	As per current B4 estimate
	Gate 2 B5 estimate updated with current learning
	As per current B4 estimate updated to comply with B5 scope (90 MLD WRP & EBL etc)

Appendix 7D: Operational and whole life carbon estimates

The OAP review MCDA assessment was informed by updated operational carbon estimates produced at Gate 3A for the SO, and the outputs of a bespoke assessment undertaken for the purposes of the OAP review by the SWS Cost Intelligence Team and Carbon Team for the BUO. A breakdown of these estimates, together for the SO and BUO is shown in Table 50, along with the total whole life (embedded and operational) carbon estimates.

Table 50: Breakdown of updated operational carbon estimates and total carbon, SO and BUO

Option			B5 Gate 2 Update 1			B4 Gate 3A			Comments
Component			WRP	Transfer	Total	WRP	Transfer	Total	
Flows (ML/d)			90	90		60	90		
Carbon emissions	Type	Units							
Operational maintenance	Fixed	tCO2e/y	20	34	53	18	27	44	Based on % of initial capital carbon
Chemicals	Variable	tCO2e/y	11,179	0	11,179	7,482		7,482	Total for multiple chemicals
Power consumed	Fixed	tCO2e/y	204	40	244	139	40	180	Based on Year 1 (2033) grid power emission factors
Power consumed	Variable	tCO2e/y	1,300	1,032	2,332	888	1,032	1,920	
Transport	Variable	tCO2e/y	382	0	382	255		255	Chemical deliveries
Total OpCarb	All	tCO2e/y	13,084	1,106	14,189	8,783	1,099	9,881	
Whole Life Carbon									Based on 80 year duration
Capital Carbon		tCO2e			191,259			148,450	
Operational Carbon		tCO2e			881,778			595,775	
Total Whole Life Carbon		tCO2e			1,087,609			754,362	

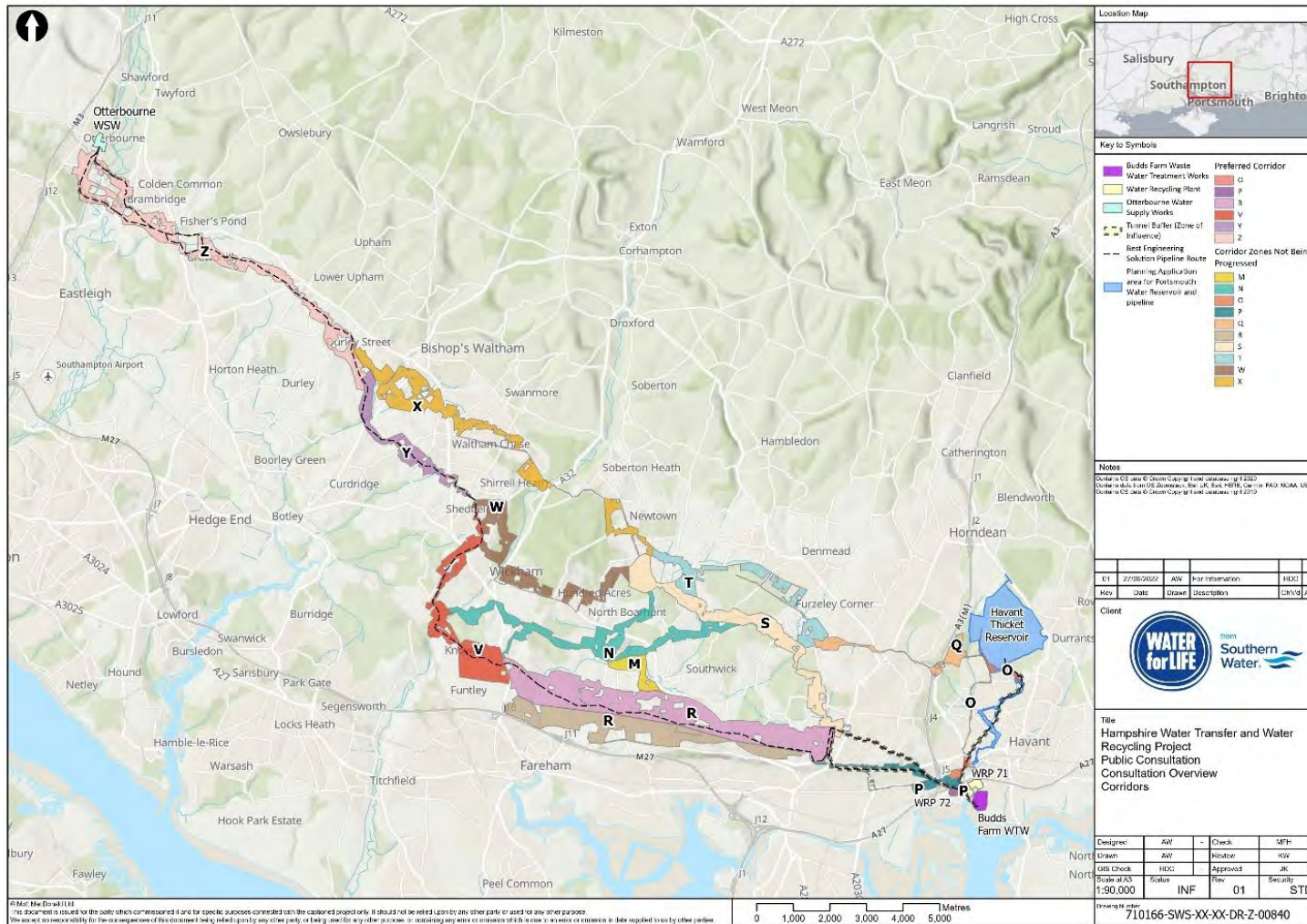
Appendix C Pipeline Corridor Section and AGP Zone Review Outcomes

C.1 Corridor Section Evaluation: The Preferred Corridor

- C.1.1 This section sets out the conclusions of the evaluations of each corridor section. A plan of the pipeline corridor sections is shown in Graphic C-1. The Book of Maps as presented at the Summer 2022 Consultation can be found at the end of this appendix.

Hampshire Water Transfer and Water Recycling Project

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Graphic C-1: Stage 3 Pipeline Corridors

C.2 Corridor Section O

- C.2.1 Corridor Section O was required to connect the WRP to Havant Ticket Reservoir. Two options were considered: an open-cut route constructed within the existing road network, and a tunnel. At the north of the corridor, the route required an open-cut connection into the Havant Thicket Reservoir.
- C.2.2 Depending on the route selected from the Havant Thicket Reservoir to Otterbourne, two pipelines may have been required in this corridor.
- C.2.3 Maps of Corridor Section O can be viewed in Sheet 1 and 2 of the Book of Maps.

Table C-1: Corridor Section O constraints overview

Topic	Open-Cut Route	Tunnelled Route
Constructability	Two pipelines could be required, with a trench approximately 4m wide. This would need temporary road closures, including sections of Bedhampton Road, Park Lane and Middle Park Way. The route would follow a similar route to the Portsmouth Water scheme, but would be commenced after those works had been completed.	Tunnelling would mean construction works will be mostly underground with some surface construction works at either end of the corridor section for the tunnel drive and reception shafts. Intermediate shafts may be required along the tunnel route to allow for safe operation of the Tunnel Boring Machine, and these will be identified at subsequent design stages.
Hydraulics	Due to the topography of the corridor, both the open-cut and tunnelled options would need to be pumped. The pipeline from the Havant Thicket Reservoir can utilise a gravity feed due to the topography of the corridor.	
Landscape	The north of the route intersects Staunton Country Park and the above ground construction would potentially temporarily impact access to certain areas as well as landscape quality. The south of the route intersects Bidbury and Bedhampton Park and the above ground construction could lead to temporary restrictions to access and loss of landscape features.	The tunnel reception shaft in the proximity of the Havant Thicket Reservoir would be potentially located within Staunton Country Park and above ground construction would temporarily impact. Open-cut construction would still be required to connect the tunnel to the reservoir.
Ecology	The route crosses the Hermitage Stream, which is upstream of the Solent Maritime SAC and the Solent and Southampton Water Ramsar site. There is potential for pollution resulting from construction works which could adversely impact water quality in the stream and the designated sites. Impacts can be reduced by a trenchless crossing underneath the Hermitage Stream and the implementation of best practice measures. Sections of the corridor section intersect floodplain and coastal grazing marsh and deciduous	There is potential for impacts on deciduous woodland and floodplain and coastal grazing marsh priority habitat as a result of the construction of tunnel launch and reception sites. Further detailed design stages would aim to reduce the potential for impacts through sensitive siting of the shafts.

Topic	Open-Cut Route	Tunnelled Route
	woodland priority habitat. There is potential for a temporary loss of habitats during construction which would require reinstatement.	
Heritage	<p>The route would intersect the Bidbury, Old Brockhampton and the Sir George Staunton Conservation Areas and could harm these heritage assets.</p> <p>The north of the corridor section route intersects the Leigh Park Grade II* Listed Park and Garden at Staunton Country Park. Construction has the potential to affect the character and setting of the park, which further design would seek to reduce.</p>	<p>The tunnel launch shaft will be in the proximity of the Bedhampton and the Old Brockhampton Conservation Areas. The tunnel reception shaft will be within the Sir George Staunton Conservation Area. Construction has the potential to affect the character and setting of the park, which further design would seek to reduce.</p> <p>The north of the corridor section intersects the Leigh Park Grade II* Listed Park and Garden at Staunton Country Park. Construction has the potential to affect the character and setting of the park, which further design would seek to reduce.</p>
Water Quality	<p>The corridor section route intersects several watercourses in Havant, including the Hermitage Stream. There is therefore potential for pollution generated by construction activities. Trenchless crossing and the implementation of best practice measures would seek to reduce impacts.</p> <p>The south of the corridor section is within a SPZ 1 and Drinking Water Safeguarding Zone for Bedhampton Spring. Construction in this area has potential for impacts to groundwater quality.</p>	<p>Tunnelling has the potential to impact on the quality and quantity of groundwater within the East Hants Chalk and South Hants Lambeth Group. The south of the corridor section is within a SPZ 1 and Drinking Water Safeguarding Zone for Bedhampton Spring. Tunnelling within this area has potential for impacts to groundwater quality.</p>
Flood Risk	<p>The corridor section route intersects areas at high risk of flooding. Further work would be needed to understand the potential of construction works to increase flood risk.</p>	<p>The launch and reception shafts are located outside of high flood risk areas.</p>
Geology and Soils	<p>The corridor section route runs along the road network and there is potential contamination that could be mobilised during construction.</p> <p>A section of the south of the corridor section would intersect Grade 1 agricultural land, which could be adversely impacted during construction.</p>	<p>No constraints identified</p>

Topic	Open-Cut Route	Tunnelled Route
Socio-economics	Construction works would lead to temporary impacts to the road network in Havant, which could be considered significant. This would affect access to residential properties and community facilities. Construction close to residential properties has the potential to impact on air quality, noise and vibration. Access to Staunton Country Park and Bidbury and Bedhampton Park may be restricted during construction.	There is potential for vibration impacts during tunnelling. Excavated materials would also increase road traffic. Access to Staunton Country Park and Bidbury and Bedhampton Park may be restricted during construction.
Special Category Land	Staunton Country Park and Leigh Park are public open space and construction may lead to temporary closures to parts of these areas.	

Conclusion

- C.2.4 A tunnelled route for Corridor Section O was the preferable option. This avoided construction within the road network, which would result in adverse impacts on the local transport network and restrict access to community facilities. Likely impacts of dust emissions, noise and vibration would also be significantly reduced.
- C.2.5 A tunnelled route would avoid intersecting the Hermitage Stream, which is linked to ecological sites in Langstone Harbour. The tunnelled route would also not impact high flood risk zones.
- C.2.6 Impacts on open space would be reduced by tunnelling. However, construction works within Staunton Country Park and Leigh Park listed park and garden could not be avoided.

C.3 Corridor Section P

- C.3.1 This corridor section connects Corridor Section O to Corridor Section R. It involves routing through Drayton and Farlington, to Portsdown Hill. Two options for the pipeline were considered: an open-cut route within the existing road network, or a tunnelled route.
- C.3.2 There was optionality in the open-cut route to either route south following Havant Road and Farlington Avenue or further north along Portsdown Hill Road.
- C.3.3 There were two potential tunnelled routes, a northern option (P1) and a southern option (P2).
- C.3.4 Maps of Corridor Section P can be viewed in Sheet 2 and 3 of the Book of Maps.

Table C-2: Corridor Section P constraints overview

Topic	Open-Cut Route Constraints	Tunnelled Route Constraints
Constructability	Trenchless crossing of the A27, A3(M) and the west coast railway line would be required.	As a result of the topography of the corridor, a deep tunnel will be required.

Topic	Open-Cut Route Constraints	Tunnelled Route Constraints
	Open-cut construction would be required along sections of Havant Road, Portsdown Hill Road, and Farlington Avenue. This is likely to result in impacts on the transport network in Drayton and Farlington.	The tunnel launch shaft would preferably be located near to the WRP site, and the reception shaft would be located on the ridge of Portsdown Hill. For the tunnel reception shaft, there is optionality to site the shaft further to the north, or further to the south.
Hydraulics	Corridor Section P rises from east to west relatively sharply up to the ridge of Portsdown Hill. Therefore, the pumping station must be located to the east before the pipeline ascent of Portsdown Hill. The open-cut route through Farlington Avenue would require several bends which is hydraulically undesirable as it results in greater energy losses.	Corridor Section P rises from east to west relatively sharply up to the ridge of Portsdown Hill. Therefore, the pumping station must be located to the east before the pipeline ascent of Portsdown Hill to allow the water to be transferred up Portsdown Hill.
Landscape	Open-cut construction on the ridge of Portsdown Hill would result in temporary adverse impacts to the visual amenity of the area given Portsdown Hill is an elevated and highly visible landscape. The route also intersects the Portsdown Hill Open Downs LCA, where there is potential for adverse impacts to landscape quality.	The tunnel reception shaft is located on the ridge of Portsdown Hill. As Portsdown Hill is an elevated and highly visible landscape, construction works would potentially temporarily adversely impact the visual amenity of the area. Siting the tunnel reception shaft further north would reduce these impacts.
Ecology	The south of the corridor section is in the proximity of the Chichester and Langstone Harbour SPA and Ramsar sites. There is potential for impacts to habitats that are functionally linked to these sites. Noise and vibration generated by construction works also have the potential to impact these sites. The corridor section intersects areas of lowland meadow and grassland priority habitat. The route also intersects several locally designated SINCs.	No significant constraints identified.
Heritage	Fort Purbrook is directly north of the corridor section, north of Portsdown Hill Road. The fort is designated as a Scheduled Monument and Grade II* listed building. Construction of the pipeline has potential to temporarily adversely affect the setting of the fort. There is also potential for buried archaeology surrounding Portsdown Hill which could be encountered during construction of	The southern tunnel route (P2) would be in close proximity to Fort Purbrook which is designated as a Scheduled Monument and Grade II* listed building. Therefore, the northern tunnelled route would be preferred.

Topic	Open-Cut Route Constraints	Tunnelled Route Constraints
	the pipeline. The southern open-cut route would be preferable from a heritage perspective.	
Water Quality	The south of the corridor section is in the proximity of Langstone Harbour. There is potential for pollution to reach the harbour as a result of construction activity. Best practice mitigation would be employed to avoid impacts.	The northern tunnel option (P1) would be located within SPZ 1, and therefore construction of the tunnel has the potential to adversely impact groundwater quantity and quality. Further detailed design in the future would be required to reduce potential impacts.
Flood Risk	The corridor section does not intersect any high-risk flood zones.	The northern tunnel reception shaft option is located south of a high-risk flood area. Further detailed siting would be required to ensure there is no impact on flood risk.
Geology and Soils	The corridor section has the potential to encounter sources of contamination in Farlington and at Fort Purbrook which could potentially be mobilised as a result of construction works.	The southern tunnel route (P2) has the potential to encounter sources of contamination at Fort Purbrook which could potentially be mobilised as a result of construction works.
Planning	The corridor section intersects with a housing development under construction south of Havant Road. However, the pipeline could be routed to avoid this. The north of the corridor section intersects Countryside Rights of Way land south of Portsdown Hill Road.	No constraints identified.
Socio-economics	Open-cut construction has the potential for disturbance to residential properties through noise, vibration and air quality, and impact access to properties and community facilities.	There is potential for vibration impacts during construction of the tunnel. Material will be removed from the tunnel at the tunnel launch shaft. There would be an increase in traffic on the wider road network.
Special Category Land	The southern open-cut route intersects land held by the Ministry of Defence on Farlington Avenue.	The southern tunnel (P2) would intersect land held by the Ministry of Defence on Farlington Avenue.

Conclusion

- C.3.5 A tunnelled route would reduce the potential air quality, noise, vibration, socio-economic, transport and landscape impacts relative to the open-cut route. An open-cut route was therefore not progressed. A tunnelled route with optionality for a northern (P1) or southern tunnel (P2) was taken forward.

C.4 Corridor Section R

- C.4.1 Corridor Section R routes east to west along the ridge of Portsdown Hill and south of Southwick before crossing the valley of the River Wallington. This corridor section would be constructed using an open-cut method.
- C.4.2 Maps of Corridor Section R can be viewed on Sheets 3, 4, 5 and 6 of the Book of Maps.

Table C-3: Corridor Section R constraints overview

Topic	Open-Cut Route Constraints
Constructability	<p>The corridor section is principally located on agricultural land. The River Wallington would be crossed using a trenchless technique.</p> <p>This corridor section runs through an existing utility corridor used by several suppliers. Most of the existing utilities run along the southern section including gas mains and high-voltage cables. The pipeline route is positioned further north to avoid these where possible.</p>
Hydraulics	<p>The corridor section is routed east to west. The south of the corridor section is along the ridge of Portsdown Hill, and the north of the corridor section follows the base of the River Wallington valley.</p> <p>The pipeline route should, where possible, avoid undulating sections Corridor Section R.</p>
Landscape	<p>The corridor section intersects the Portsdown Hill and Forest of Bere Special Landscape Quality Areas and the Portsdown Hill Open Downs LCA.</p> <p>To avoid temporary impacts on the landscape, the pipeline should be routed adjacent to the existing B-road, as the backdrop of woodland would provide screening.</p>
Ecology	<p>Most of this corridor section is arable land. There is potential for impacts to habitats functionally linked to the Portsmouth Harbour Ramsar and SPA, as well as hydrological impacts when crossing the River Wallington. Trenchless construction underneath the river and best practice methods would reduce impacts.</p> <p>Northern sections of the corridor intersect lowland meadows with adjacent deciduous woodland priority habitat. One area of lowland meadow is likely to be unavoidable within the corridor. However, any loss of the priority habitat will be temporary and reversible. In this area, the corridor section is directly adjacent to the Stroud Coppice ancient woodland and SINC. A buffer would be required to avoid impacts. Species associated with the SINC may be disturbed during the works. Routing further south in the corridor section would avoid interfaces with these ecological sites.</p> <p>There are two SINCS within the corridor, further pipeline routing should avoid intersecting with these sites.</p>
Heritage	<p>The corridor section is in the proximity of Fort Southwick (grade I), Fort Nelson (grade I) and Fort Widley (grade II*) listed buildings and Scheduled Monuments. As a result of the open landscape area, the setting of these assets will be sensitive to temporary construction impacts. The corridor section also include the Church of St Nicholas (grade I listed building), The Nelson Monument (grade II* listed building) and the World War II Heavy Anti-Aircraft Gunsite at Monument Farm Scheduled Monument.</p> <p>To mitigate impacts on the settings of heritage assets, a northern route would be preferred, to move further down the Portsdown Hill ridge, out of view.</p> <p>Below-ground works are likely to encounter archaeological remains associated with heritage assets. Further archaeological assessment would</p>

Topic	Open-Cut Route Constraints
	be required. The west of the corridor section is less sensitive, but there is still potential for buried archaeology.
Water Quality	<p>The corridor section crosses the River Wallington, where there is potential for impacts to the hydrology and geomorphology of the river. Trenchless crossing of the river and its floodplain and best practice mitigation would be employed to reduce the potential for impacts.</p> <p>At the far north of the corridor, there is potential for impacts to the geomorphology from the crossing of an unnamed watercourse near Southwick Park Lake. Impacts could be reduced when open-cut trenching by using temporary dams to allow work to be undertaken in dry conditions, and reinstating the channel once the trench has been installed. Once operational, the pipeline could become exposed as a result of adjustment of the bed and banks of the watercourse, which could result in geomorphological instability.</p> <p>There is potential for impact on water quality during construction as a result of sediment supply and contaminants to Potwell Tributary, River Wallington below Southwick and an unnamed watercourse near Southwick Park Lake. Best practice mitigation would be required to prevent these impacts. Routing through the south of the corridor section would reduce impacts by reducing interfaces with watercourses.</p> <p>The west of the corridor section is within SPZ 3 and a Drinking Water Safeguarded Zone, with the south west of the corridor section within SPZ 1. Mitigation is required to ensure there would be no impacts to groundwater as a result of construction.</p>
Flood Risk	The corridor section intersects high risk flood areas associated with the River Wallington
Geology and Soils	<p>The Portsdown Oil Fuel Reservoir is located at the south of the corridor. There are additional historic landfills and potentially contaminated land associated with previous military uses directly south of the corridor section which should be avoided.</p> <p>Parts of the west of the corridor section is Grade 1 agricultural land.</p>
Planning	<p>The southeast of the corridor section intersects with designated open space. The west of the corridor section is within the approved Welborne Garden Village development, comprising 6000 dwellings, community facilities, commercial and employment space.</p>
Socio-economics	The west of the corridor section is adjacent to Boundary Oak School, future pipeline route refinement would be required to ensure impacts are avoided.
Special Category Land	Southern sections of the corridor section is owned by the Ministry of Defence, and these areas should be avoided by the pipeline.

Conclusion

- C.4.3 There were significant constraints relating to heritage and landscape in this corridor section during construction.
- C.4.4 Acknowledging the constraints associated with the south of the corridor, it was proposed that this corridor section was reduced in size, to follow a northern route which would avoid the identified heritage assets. The south of the corridor section was therefore not progressed, but the north of the corridor was progressed as part of the preferred corridor as the significant constraints within the corridor section were avoided by removing the southern part.

- C.4.5 This corridor section would avoid the need for the initial pipeline routes that were identified before Gate 2 further north, which intersect the South Downs National Park.
- C.4.6 Corridor Section R potentially reduced the number of permanent AGP needed across the pipeline route compared to other corridor options. However, there was a possibility that the requirement for additional AGP is identified as the scheme is developed further, and would be dependent on pipeline routing and system design.

C.5 Corridor Section V

- C.5.1 Corridor Section V connects from Corridor Section R northwards towards Corridor Section Y. It crosses the River Meon and passes to the west of Wickham. There were two options to reduce the length of construction works needed on Titchfield Lane, a western option which includes an area of ancient woodland and an eastern option which goes further into Wickham Park Golf Club.
- C.5.2 Maps of Corridor Section V can be viewed on Sheets 6 and 7 of the Book of Maps.

Table C-4: Corridor Section V constraints overview

Topic	Open-Cut Route Constraints
Constructability	<p>A crossing of the Winchester Road (A32) is required, which could be constructed using an open-cut or trenchless method. Open-cut construction would involve a lane closure which has the potential for disruption on this route.</p> <p>The corridor section involves routing along Titchfield Lane which is a narrow and busy route. To avoid a temporary road closure, there are two alternative locations where a crossing of the road can be made.</p> <p>Crossing of the River Meon can be completed through trenchless construction.</p>
Hydraulics	<p>The crossing of the River Meon is one of the lowest points within the corridor section route. The topography increases north of Wickham, which means that a pumping station may be needed at the IPS-3 Zone.</p>
Landscape	<p>The corridor section is within the Lower Meon Valley ASLQ and adjacent to the western boundary of Portsdown Hill and Fareham ASLQs. The landscape is described as a wooded and enclosed and the Hampshire Character Assessment notes the tranquillity of the landscape.</p> <p>Ancient woodland is adjacent to the corridor section, meaning that the siting of the pipeline route should ensure an adequate buffer to avoid impacts.</p> <p>There are 9 TPOs throughout the corridor section.</p> <p>This corridor section would provide a route outside of the South Downs National Park.</p>
Ecology	<p>The corridor section crosses the River Meon which is upstream of the Southampton and Solent Water Ramsar. It is also a compensatory habitat under the Southern Water drought scheme. Any hydrological impacts to the River Meon could potentially impact the Ramsar site. Trenchless crossing of the River Meon would reduce the potential for impacts, and could be extended across the floodplain grazing marsh to avoid impacts to this functionally linked habitat. Further assessment is required to ensure that trenchless crossing of the River Meon would not pose a hydrogeological risk to the watercourse or the functionally linked floodplain grazing marsh.</p>

Topic	Open-Cut Route Constraints
	The western alternative route at Titchfield Lane would intersect an area of deciduous woodland priority habitat and ancient woodland. A route along Titchfield Lane, or the eastern option would be preferred in terms of the NPSWRI as it would avoid ancient woodland.
Heritage	The corridor section is directly adjacent to Little Park Mansion which is a grade II listed building. The Chichester to Bitterne Roman Road intersects the corridor section and there is a high potential for archaeology. The eastern option at Titchfield Lane is least preferred as the pipeline route would be close to the Wickham Heritage Conservation Area.
Water Quality	The corridor section crosses the river Meon which is a chalk river and as such is sensitive to the supply of fine sediment or changes in hydrology. Trenchless crossing of this watercourse and its associated floodplain would reduce potential impacts.
Flood Risk	The corridor section crosses areas of flood zone 2 and 3 associated with the river Meon. Flood risk will need to be managed during construction in this area.
Geology and Soils	Historic landfills have been identified adjacent to the corridor section. Mitigation is required to ensure there is no mobilisation of contaminants as a result of construction activities.
Planning	The corridor section intersects the Welborne Garden Village development. The corridor section also intersects land subject to an application for 200 dwellings and green infrastructure. Further coordination would be required.
Socio-economics	The corridor section intersects Wickham Park Golf Club, and therefore construction will result in land take from the golf club. The western route at Titchfield Lane or the route along Titchfield Lane would reduce the amount of land required. The eastern option crosses further into the golf club, requiring more land.
Special Category Land	The south-east of the corridor section intersects with land owned by Homes England. The arrangements for the land required within Wickham Park Golf Club would need to be established.

Conclusion

- C.5.3 This corridor was outside of the South Downs National Park but was located in a sensitive landscape. There was potential for ecological and hydrological impacts associated with watercourse crossings, requiring mitigation. The corridor section crosses Wickham Park Golf Club and there were intersections with other development proposals, which require further co-ordination.
- C.5.4 Additional options were introduced to address constructability constraints associated with works to Titchfield Lane. The western route was not preferred as a result of direct impacts to ancient woodland and the golf club. The original route and the eastern route had constraints relating to impacts on the road network and impacts on Wickham Park Golf Club.
- C.5.5 This corridor section was progressed as part of the preferred corridor.

C.6 Corridor Section Y

- C.6.1 Corridor Section Y connects northwest from either Corridor Section V or Corridor Section W to Corridor Section Z. Given the corridor section's proximity to residential receptors when crossing Winchester Road and Black Horse Lane there were options in the corridor section.
- C.6.2 Maps of Corridor Section Y can be viewed on Sheets 8 and 9 of the Book of Maps.

Table C-5: Corridor Section Y constraints overview

Topic	Open-Cut Route Constraints
Constructability	The crossing at the High Street in Shirrell Heath is a pinch point close to several residential properties. Another pinch point is located when crossing Winchester Road (B2177). A trenchless crossing would likely be required, however there is limited space to the west of Winchester Road given the residential properties in the area. The northern option provides an alternative route further north for crossing Winchester Road, where there are fewer residential properties. Trenchless crossing of the River Hamble would be required.
Hydraulics	The corridor section crosses three river valleys related to the River Meon and Hamble, with little scope to avoid high points. Trenchless crossings at Shirrell Heath and Curdridge Lane would flatten the hydraulic profile.
Landscape	Construction may have temporary effects on landscape, including, field boundaries, trees and woodland. There is potential for visual amenity impacts on residential receptors during construction. The corridor section crosses Pilgrims Trail long distance route. There is potential for a change of view from this route during construction.
Ecology	The corridor section crosses the River Hamble which is upstream of the Solent Maritime SAC and Solent and Southampton Water Ramsar. A trenchless crossing would be needed to avoid hydrogeological impacts. The corridor section crosses an area of deciduous woodland priority habitat. The northern option at Winchester Road and Black Horse Lane crosses traditional orchard priority habitat. If habitats were lost, compensation may be required. Turtle Dove population(s) have been identified within the corridor section. Removal of hedgerows and scrub within the proximity of these areas should be avoided.
Heritage	There are no nationally designated heritage assets within the corridor section. There is potential for buried archaeology around the River Hamble. Careful placement of trenchless crossing shafts would be required.
Water Quality	The River Hamble should be crossed trenchless to avoid impacts to the hydrology or geomorphology of the watercourse. The corridor section is within the River Hamble and Hamble Estuary Urban Waste Water Treatment Directive Catchments. Construction works should consider how temporary waste water is managed.
Flood Risk	The corridor section crosses flood zone 2 and 3 when crossing the River Hamble. Trenchless construction across the river would reduce and avoid impacts within high-risk flood areas.
Geology and Soils	The corridor section crosses the Land at Rossgarth historic landfill. The northern option at Winchester Road and Black Horse Lane would avoid potential contaminated land impacts.

Topic	Open-Cut Route Constraints
	Shirrell Heath Sand Pit is adjacent to the corridor section and Ash House Farm historic landfill is partially within the corridor section. There is potential for contaminated land in this area. The corridor section intersects areas of Grade 1 agricultural land.
Planning	South of Waltham Chase, west of the Winchester Road, there was a minerals and waste application for the excavation of 230,000 tonnes of soft sand with phased working and restoration backfilling with up to 435,000 tonnes of clean inert waste/materials. If construction works are to take place alongside the working of this site, there is potential for disruption to the road network and residents.
Socio-economics	The corridor section passes near to residential properties. The northern option at Winchester Road and Black Horse would be preferred as it avoids residential receptors. The corridor section is adjacent to the Meon Valley Hotel and Country Club. Routing to the north of the corridor section will mitigate impacts on this site.
Special Category Land	There is potential for impacts to open space provided by the Meon Valley Hotel and Country Club.

Conclusion

- C.6.3 The most significant constraints within this corridor section related to constructability and the potential for construction work taking place close to residential properties. The northern option at Winchester Road and Black Horse Lane could be utilised to reduce potential impacts as well as standard construction mitigation. This corridor section was part of the preferred corridor.

C.7 Corridor Section Z

- C.7.1 Corridor Section Z connects Corridor Sections X and Y in the southeast to Otterbourne in the north.
- C.7.2 At Durley Street south of Newtown, there was optionality in the corridor section to avoid intersections with watercourses and electricity cables.
- C.7.3 There was further optionality south of Fisher's Pond, where the corridor section splits. The northern route (Z1) along Portsmouth Road (B2177), and the southern route (Z2) passes north of Crowdhill and adjacent to the Park Pale at Marwell Scheduled Monument, which is within an area of high archaeological potential.
- C.7.4 At the north-west of the corridor section, there were two options for crossing the River Itchen. The northern route (Z3) passed through the South Downs National Park. The southern route (Z4) passed south, outside of the South Downs National Park but intersected the floodplain of an upstream tributary of the River Itchen. Both. Both options would involve tunnelling under the River Itchen to avoid any direct works within the river.
- C.7.5 Maps of Corridor Section Z can be viewed on Sheets 9, 10 and 11 of the Book of Maps.

Table C-6: Corridor Section Z constraints overview

Topic	Open-Cut Route Constraints
Constructability	<p>South of Newtown, the corridor section runs close to overhead power lines. To avoid this, the route would need to be located further north, encroaching on playing fields in Newtown. An alternative option was identified which allows the route to pass south of the overhead power lines.</p> <p>At Fisher's Pond there are two options. There is the option to route north (Z1), along Portsmouth Road (B2177), and then continue north through Fisher's Pond along Main Road (B3354). A culvert crosses Main Road, therefore a trenchless crossing could be required and associated temporary road closure and traffic management measures. Alternative to this route is routing further south using route Z2 towards Crowdhill. This involves a trenchless crossing of Winchester Road, re-joining the northern option near Brambridge.</p> <p>The constructability considerations for the two River Itchen options are described below:</p> <p>Northern Route (Z3): A tunnel to travel the full length under the River Itchen and cross the South West Main Line railway at an acute angle. An engineering case to justify the railway crossing at this angle would be needed, approved by Network Rail. A launch shaft would be constructed to the east of the River Itchen with reception shaft to the west of the railway. Leading to and from the shafts the pipeline would likely be laid as open-cut.</p> <p>Southern Route (Z4): The southern route would avoid construction in the National Park. A tunnel to travel the full length under the River Itchen is envisaged. This route crosses the South West Main Line railway at a more acceptable angle. Further engagement with Network Rail would be required. A launch shaft will be constructed to the east of the River Itchen with reception shaft to the west of the railway. Leading to and from the shafts the pipeline would likely be laid as open-cut. This route provides a greater number of crossing opportunities of the River Itchen, with a view to increase the distance from the chalk aquifer which ground water is abstracted from. The further south the crossing is made, the more likely the crossing can be made through the impermeable clay strata which will offer protection to the nearby groundwater resources.</p>
Hydraulics	<p>The east of the corridor section is hydraulically unconstrained except for a local high point south of Lower Upham. There is an opportunity to site a BPT to enable gravity flows to Otterbourne in this corridor section. Should a BPT not be required, the pipeline should be routed as far north as possible as it passes the two potential BPT sites to avoid elevation changes.</p> <p>There are no hydraulic differences between the two River Itchen crossing options.</p>
Landscape	<p>The length of the corridor section is in proximity of the South Downs National Park, especially at Lower Upham, but only a short section intersects the National Park (section Z3). The route should be sited to avoid potential adverse impacts on the setting of the National Park, in accordance with the NPSWRI.</p> <p>The landscape considerations of the two River Itchen options are described below:</p> <ul style="list-style-type: none"> • Northern Route (Z3): This route intersects the South Downs National Park and the remaining corridor section is within its setting. There is an alternative option to cross from east of the River Itchen to Otterbourne, which would be preferable in line with the NPSWRI. • Southern Route (Z4): This option is outside of the South Downs National Park. The corridor section is within a locally designated valued landscape

Topic	Open-Cut Route Constraints
	<p>where there is limited potential for effects on the special qualities of the landscape. Construction activity and siting would seek to reduce impacts to landscape character. There are TPOs within and adjacent to the corridor section which should be avoided. The corridor section intersects with the Itchen Way. There is potential for intrusive works to affect views from this route.</p> <ul style="list-style-type: none"> • There are 4 TPO groups and 27 individual TPO trees within or adjacent to the corridor section. The route should avoid impact with these trees. • Loss of trees, woodland and other landscape features will have an impact on Forest of Bere and Itchen Valley LCAs.
Ecology	<p>The corridor section intersects areas of floodplain grazing marsh, lowland meadow and deciduous woodland priority habitat, and the following Sites of Importance for Nature Conservation: Kimbers Copse, Chestnut Gully Wood and Fielders Farm Meadows. These areas should be avoided where possible to prevent habitat loss.</p> <p>The northern route (Z1) at Fisher's Pond is preferred to avoid impacts to woodland within the southern route (Z2).</p> <p>The ecology considerations of the River Itchen crossing routes is as follows:</p> <ul style="list-style-type: none"> • Northern Route (Z3): This route involves tunnelling under the River Itchen and therefore avoids direct impacts on the SAC and SSSI designation. The further reduction of impacts is reliant upon constructing the tunnel within the clay ground and avoiding alluvium which supports habitats within the River Itchen. Further design work is required to ensure this. West of the River Itchen, the route intersects floodplain grazing marsh priority habitat associated with a tributary of the River Itchen, which should be considered functionally linked to the River Itchen SAC. Siting the pipeline route as far east within the corridor section would reduce the potential loss of habitat. • Southern Route (Z4): This route involves tunnelling under the River Itchen, which avoids impacts on the SAC and SSSI designation. The reduction of impacts assumes on a tunnel within the clay ground and that avoiding alluvium which supports habitats within the River Itchen. Further design work is required to ensure this is feasible. As this route option is sited further south to avoid intersecting the South Downs National Park, the route intersects with a tributary of the River Itchen which has the potential to harm the SPA. Trenchless crossing of this tributary would reduce impacts however this is unlikely to result in a significant reduction in risk as construction activity will be required within the floodplain of the tributary. The intersection of the tributary of the River Itchen west of the River Itchen would result in intersecting floodplain grazing marsh priority habitat. Construction activity is likely to result in the loss of priority habitat. The route is adjacent to the Otterbourne Wood SINCS. There is potential for impacts to root protection zones, and therefore adequate buffers should be implemented to avoid these impacts.
Heritage	<p>The southern route (Z2) at Fisher's Pond is adjacent to the Park Pale at Marwell Scheduled Monument. This is associated with further heritage assets at Marwell Manor which is north east of the corridor section where there are further Scheduled Monuments. There is potential for nationally significant buried archaeology in this area which could be impacted during construction.</p> <p>The southern River Itchen crossing option (Z4) is adjacent to the Moat Otterbourne Manor Scheduled Monument. There is potential for impacts to the setting of this site. The northern route (Z3) is approximately 200 m away from the Scheduled Monument.</p>

Topic	Open-Cut Route Constraints
Water Quality	<p>South of Newtown, the corridor section runs along the route of a watercourse. This watercourse drains into a sensitive system related to the River Hamble, and therefore mitigation will be required to avoid increased in the supply of fine sediment and contaminants. The southern option at Durley Street is preferable to avoid this watercourse.</p> <p>South of Lower Upham, the corridor section crosses SPZ 1 and 2. There may be constraints related to deep excavation in this area, although near-surface excavations are likely to be acceptable.</p> <p>The southern route option (Z2) at Fisher's Pond is preferred, however both options would involve more than one water course crossing. The northern option (Z1) would involve crossing in SPZ 2, but this would be avoided in the southern option.</p> <p>Crossing the River Itchen involves crossing a number of other watercourses that are connected to it. During construction there is potential for water quality impacts through the supply of fine sediment and contaminants. A tunnelled crossing of the River Itchen would avoid direct impacts. The southern route intersects (Z4) an additional tributary of the River Itchen and has potential for greater water quality impacts than the northern route (Z3).</p> <p>The area is within SPZ 1. Therefore, there will be constraints related to deeper excavations for trenchless crossings. Construction work related to the crossing would be preferable within the London Clay, below the alluvium that supports the river and above the chalk that supports the groundwater abstraction.</p>
Flood Risk	<p>South of Fisher's Pond, the corridor section intersects Flood Zone 2 and 3. The southern option (Z2) runs along flood zone 2 and 3, and as a result of the sequential test, the northern option (Z1) would only involve a minor crossing of flood zone 2 and 3. Further detailed siting of tunnel launch and reception shafts would be required for crossing the River Itchen given the proximity to areas of Flood Zone 2 and 3.</p>
Geology and Soils	<p>The western option at Durley Street would be preferred, to avoid existing sources of contamination.</p> <p>The south route (Z2) at Fisher's Pond crosses through Crowdhill historic landfill. Ground investigation is required to assess contamination risk. Therefore, the northern option (Z1) is preferred.</p> <p>The southern route (Z4) across the River Itchen intersects with a historic landfill at land between Brambridge Road and Kiln Lane. There is potential for the mobilisation of contaminants which could impact human health and controlled waters. Construction in this area should be avoided. Ground investigation is required to assess the risk posed by this source of contamination. The potential pipeline and tunnel route would avoid this site.</p> <p>Crossing of the River Itchen and South Downs National Park would be preferable within the London Clay to keep out of the principal aquifer.</p>
Planning	<p>The corridor section is adjacent to housing allocations south of Bishop's Waltham. The southern option at Durley Street would be preferred to avoid any potential impacts related to compatibility with future developments.</p> <p>The corridor section intersects the route of the Esso Southampton to London Pipeline, consultation is required to understand potential for compatibility and constraints.</p>
Socio-economics	<p>The southern option at Durley Street is preferred to avoid impacts to playing field south of Newtown.</p> <p>The southern route (Z2) at Fisher's Pond is preferred to avoid disruption to the road network and local community.</p>

Topic	Open-Cut Route Constraints
Special Category Land	West of Bishop's Waltham are allotments, which are adjacent to the corridor section.

Conclusion

- C.7.6 The corridor section passed south of the South Downs National Park except for optionality at Z3 which intersected a small part of the National Park. Routing should seek to limit any potential impacts to the setting of the National Park.
- C.7.7 This corridor section was taken forward as part of the preferred corridor section as it was required for the connection to Otterbourne.
- C.7.8 Both the northern (Z3) and southern (Z4) routes for crossing the River Itchen were taken forward to allow for comparison given the potential constraints associated with each option. Both routes would tunnel under the River Itchen.
- C.7.9 The northern route (Z3) was within the South Downs National Park and therefore a reasonable alternative should be sought in line with the NPSWRI. The southern route (Z4) had increased interfaces with tributaries of the River Itchen, which could harm the River Itchen SAC and SSSI.

Corridor Section Evaluation: Corridor Sections that are Not Being Progressed

C.8 Corridor Section Q

- C.8.1 This corridor section had been identified as an alternative corridor section to Corridor Section O as the first part of the pipeline corridor from Havant Thicket Reservoir to Otterbourne. This route encountered a number of level differences as a result of underpasses and overpasses, which would make construction challenging. A tunnelled route was not progressed as no adequate locations for intermediate shafts required for the safe operation of the tunnel boring machine were identified. As such, only an open-cut route was taken forward for evaluation.
- C.8.2 Corridor Section O also acted as a connection from the WRP to Havant Thicket Reservoir, as well as potentially the first part of the transfer pipeline from Havant Thicket Reservoir to Otterbourne, therefore, if this corridor section were to be progressed, Corridor Section O would still be required.
- C.8.3 Maps of Corridor Section Q can be viewed in Sheet 12 and 13 of the Book of Maps.

Table C-7: Corridor Section Q constraints overview

Topic	Open-Cut Route Constraints
Constructability	At the east end of the route, a full road closure is potentially required on Calshot Road to cross a culvert under the road. Trenchless crossings would be required for crossing the A3(M). The A3(M) is in a cutting at this point, and therefore the shaft will need to be deep. Locating the shaft to the west of the A3(M) will be very difficult due to the lack of access due to housing and wooded areas.

Topic	Open-Cut Route Constraints
	<p>Level differences and various underpasses make open-cut through Waterlooville unviable.</p> <p>Trenchless construction would be difficult due to limited space available for shafts, and deep crossings required to account for level differences and underpasses. Longer lengths of the corridor section would only be possible by tunnelling. An alternative to the open-cut route by tunnelling was considered. However, intermediate shafts would have to be located within the road network, which would result in extended periods of road closures on key routes in Waterlooville. Therefore, this option was not progressed.</p> <p>Trenchless construction would be required around the under-construction Berewood development. The trenchless route will need to be deep to account for drainage channels. The ground in the area of this route has a high water content presenting further constructability constraints.</p>
Hydraulics	<p>The topology of the corridor section peaks in the centre of Waterlooville which precludes the possibility of a gravity feed from east to west through open-cut construction. This means that a pumping station would be required to the east of the A3(M) and west of Havant Thicket Reservoir.</p> <p>The built ground level within the corridor section is undulating with relatively sharp ground level changes, especially in the centre of Waterlooville and around the B2150 and A3(M). This would require many air and washout valves, or a flatter pipeline profile which will require substantially deep trenches or trenchless construction in multiple locations. This is hydraulically undesirable as it leads to higher energy losses.</p>
Landscape	<p>Trenchless crossing of the A3(M) will require construction shafts in wooded areas, and therefore there is potential for the loss of areas of woodland which characterises the landscape.</p>
Ecology	<p>The route crosses the Hermitage Stream, which is upstream of the Solent Maritime SAC and the Solent and Southampton Water Ramsar site. There is potential for pollution as a result of construction activity which would adversely impact water quality within the stream and the designated sites.</p> <p>Trenchless construction underneath the river and best practice measures would be employed which would reduce the potential for impacts.</p> <p>Deciduous woodland priority habitat can be found adjacent to the A3(M) within the corridor section and floodplain grazing marsh priority habitat is found within the west of the corridor section. There is potential for temporary loss of habitats during construction which would require reinstatement.</p> <p>The corridor section intersects a SINC Conservation and is within the Havant Castle Bechstein Bat area.</p>
Heritage	<p>There are no designated heritage assets or sites within the corridor section. At the eastern end of the corridor section, there are two non-designated heritage assets within the corridor section: scatter or flint flakes and possible enclosure at Dunsbury Hill. Detailed assessment is required to identify the potential for impacts and mitigation.</p> <p>As a result of a lack of development at the east of the corridor section, the potential for buried archaeology is unknown. West of Waterlooville, the route should be kept as far south as possible, away from the watercourse to avoid encountering buried archaeology located around the river.</p>
Water Quality	<p>Crossing of the Hermitage Stream, Potwell Tributary, Old Park Stream and Park Lane Stream will be required. There is potential for pollution to the watercourses as a result of construction works. Trenchless crossing of the watercourses and best practice mitigation should be employed to reduce potential impacts.</p>

Topic	Open-Cut Route Constraints
	The corridor section is within SPZ 1, there is potential for impacts on groundwater quality resulting from the introduction of contaminants during construction.
Flood Risk	The corridor section intersects with high flood risk areas associated with river crossings.
Geology and Soils	Dunsbury Hill Farm historic landfill is within the corridor section at the east end. If construction is required within this area, suitable mitigation will be required.
Planning	West of Waterlooville, the corridor section route intersects the under-construction Berewood development. Further siting of the pipeline route at future design stages would be required to avoid impacts to this development. West of Havant Thicket Reservoir, the corridor section intersects consented commercial/employment development which is under-construction. It is assumed that the pipeline can be routed to avoid conflict with this development.
Socio-economics	The open-cut route through the road network in Waterlooville would be near a large volume of housing and community facilities including schools. There is potential for temporary impacts to human receptors through dust emissions, vehicular/plant emissions, and the generation of noise and vibration during construction with limited scope to avoid impacts resulting from proximity to receptors. Construction within the road network would result in disruption to a key transport route in Waterlooville, as well as potentially restrict the access to community facilities and businesses.
Special Category Land	There is potential for an area of woodland east of the A3(M) to be undesignated public open spaces given the proximity of residential properties. However, that would need to be confirmed through further surveys and questionnaires.

Conclusion

- C.8.4 An open-cut route would have had numerous constructability, hydraulics and engineering constraints related to ground level differences and the limited space available given the corridor section runs through a built-up area. A tunnelled route was considered to be unviable given the lack of available space in Waterlooville for intermediate shafts.
- C.8.5 The environmental constraints relate to potential ecological and landscape impacts associated with the crossing of the A3(M). There was also potential for impacts to residential properties and community facilities through noise, vibration and air quality.

C.9 Corridor Section M

- C.9.1 Corridor Section M was identified as a connection from Corridor Section R northwards to Corridor Section N which is an alternative to Corridor Section W. It involves descending from Portsdown Hill into the valley or the River Wallington.
- C.9.2 Maps of Corridor Section M can be viewed in Sheet 5 of the Book of Maps.

Table C-8: Corridor Section M constraints overview

Topic	Open-Cut Route Constraints
Constructability	The corridor section is located in mostly agricultural land, and there are limited major crossings. The River Wallington would be crossed using trenchless techniques. Trenchless crossings of roads and hedgerows can be utilised when required.
Hydraulics	The corridor section runs north to south into the River Wallington Valley. Utilisation of this option would increase the risk of requiring additional AGP across the route.
Landscape	<p>The corridor section is within the Forest of Bere LCA. There is potential for the loss of field boundaries and trees which would result in disruption to the existing landcover. Loss of landscape defining features should be avoided and reduced where possible.</p> <p>The corridor section intersects Wayfarer's Walk, Pilgrim's Trail, Staunton Way and Allen King Way. There is potential for disruption to the appreciation of views from these routes.</p>
Ecology	<p>The corridor section is adjacent to areas of ancient woodland. Therefore, appropriate buffers should be applied to avoid direct and indirect impacts to ancient woodland.</p> <p>There is potential for impacts to deciduous woodland and floodplain grazing marsh priority habitat. Works within these areas should be reduced and avoided where possible. Any loss of priority habitat should be compensated.</p> <p>The corridor section is adjacent to Ashleydown Coppice and Ham Coppice SINC. Therefore, appropriate buffers should be applied to avoid direct and indirect impacts to these sites.</p>
Heritage	<p>The corridor section is approximately 730m west of Southwick Brewhouse Scheduled Monument, approximately 850m west of Southwick Priory Scheduled Monument, and approximately 640m west of the Church of St James without the Priory Gate Grade I listed building. Direct impacts to the Scheduled Monuments would be avoided given the distance. However, there is potential for impacts to the settings of these heritage assets during construction.</p> <p>The corridor section is approximately 150m west of Southwick Conservation Area. There is potential for impacts to the character and setting of the conservation area as a result of construction activities.</p> <p>There is potential for buried archaeology within the corridor section as a result of the presence of post-medieval heritage sites.</p>
Water Quality	The corridor section crosses the Potwell Tributary, which is a tributary of the River Wallington. There is potential for sediment supply and impacts to water quality during construction. Trenchless construction can be employed to avoid construction activity within the river.
Flood Risk	The corridor section intersects Flood Zone 2 and 3 associated with the crossing of a tributary of the River Wallington. There is potential for extended sections of the corridor section to run parallel and adjacent to high flood risk areas. In accordance with the sequential test, more suitable alternatives should be explored above this corridor section considering this interface with a high-risk flood zone and the potential to increase flood risk during construction.
Geology and Soils	Sections of the corridor section are within Grade 3 agricultural land.

Topic	Open-Cut Route Constraints
Planning	The corridor section does not directly intersect any existing development or consented sites, however does run adjacent to a small number of residential properties. The pipeline should be sited to avoid close proximity to existing properties.
Socio-economics	No constraints identified
Special Category Land	No constraints identified

Conclusion

- C.9.3 This corridor could provide an alternative to a route through part of Corridor Section R, by routing further north and reducing the interfaces with heritage assets south of Corridor Section R. It avoided the interfaces with consented developments in the west of Corridor Section R. This was also an alternative to a route through Corridor Section S where there was potential for impacts to ancient woodland, ecological sites and a number of constructability constraints.
- C.9.4 Corridor Section M was largely in an area at high risk of flooding. National policy dictates that the sequential test should be applied. There were other corridor sections that did not pass through high flood risk areas to the extent of Corridor Section M, and these should be progressed ahead of this corridor section.
- C.9.5 The elevation of this corridor section resulted in an increased likelihood of requiring additional permanent AGP further along the pipeline route in Corridor Sections V and Z.
- C.9.6 As a result of the above constraints, this corridor section was not progressed.

C.10 Corridor Section S

- C.10.1 Corridor Section S ran from the Corridor Section R intersection west of Widley, prior to progressing south of Furzeley Corner and towards Shoot Hill before joining with Corridor Sections W or X.
- C.10.2 Maps of Corridor Section S can be viewed in Sheet 3, 13 and 14 of the Book of Maps.

Table C-9: Corridor Section S constraints overview

Topic	Open-Cut Route Constraints
Constructability	Predominantly over open agricultural land. One major pinch point is between two areas of ancient woodland (Dunsland Coppice and Wards Coppice) south of Furzeley Corner. Further access points to the road network may be required. Further along route there appears to be habitat corridors joining sections of ancient woodland and these would need to be cleared if open-cut option is used. This would also form a permanent wayleave where no major vegetation would be allowed to grow to protect the pipeline and maintain access.

Topic	Open-Cut Route Constraints
	<p>The corridor section goes straight through a solar farm which is approximately 850m long.</p> <p>A trenchless technique would require clearing a section of solar panels and associated infrastructure to allow access and construction from the intermediate locations.</p> <p>An open-cut solution would require the whole wayleave to be cleared of panels and associated infrastructure.</p> <p>A route through Furzeley Golf Course then heading West along the Southern boundary of Creech Wood would avoid the solar farm but still involve either removing some solar panels and infrastructure to allow an open-cut option or a trenchless solution to get from the golf course to the West of the solar farm.</p> <p>There may also be potential risks associated with accessing the pipeline for maintenance.</p>
Hydraulics	<p>There are no major elevation changes, with the possible exception of any trenchless sections. There are no constraints relating the hydraulics of the corridor section.</p>
Landscape	<p>The corridor section is within the Forest of Bere LCA characterised as a secluded landscape comprising pastures and woodland. Construction of the pipeline route has the potential to impact the tranquillity of the landscape and result in the temporary loss of woodland.</p> <p>There is potential for limited impacts to the visual amenity of residential receptors in proximity of the corridor section. The corridor section additionally intersects Allan King Way and Wayfarer's Walk long distance routes where there is potential for intrusive works to disrupt the appreciation of views during construction.</p>
Ecology	<p>The corridor section crosses the River Wallington which is functionally linked to the Portsmouth Harbour SPA and Ramsar in two locations. Impacts to the hydrology of the watercourse has the potential to impact these designated sites. Trenchless crossing of the river would avoid these impacts.</p> <p>The corridor section intersects multiple priority habitats: floodplain grazing marsh, deciduous woodland, lowland meadows, fen marsh and swamp, as well as intersecting a number of SINCs. Some intersections will be unavoidable within the proximity of the River Wallington, east of Beckford Lane.</p> <p>The corridor section route is flanked by ancient woodland in parts. There is a section where the corridor section passes through a pinch point between two areas of ancient woodland where it would not be feasible to provide a minimum of 15m buffer as advised by Natural England and the Forestry Commission (see Ancient woodland, ancient trees and veteran trees: advice for making planning decisions, 2022). Given the pipeline would be laid within a trench, there will be direct impacts to the root systems of trees within the ancient woodland. To avoid this impact, a tunnel would be required given the depth and distance a trenchless solution would be needed for. Permanent tunnel shafts would have a large land take impact, and a permanent access road would be required. There is currently no road access to this location and therefore a route of approximately 1 km would be required. A tunnelled option would result in significant construction activity in the proximity of ancient woodland and construction of the tunnel has the potential to pose further indirect impacts through polluting the ground and ground water.</p>
Heritage	<p>No nationally designated heritage sites within the corridor section. There are multiple grade II listed heritage assets located north of the northern section of the corridor section. Mitigation would be required to avoid impacts to the setting and character of these assets.</p>

Topic	Open-Cut Route Constraints
	The Chichester to Bitterne Roman Road intersects the corridor section. There is potential for buried archaeology in this area.
Water Quality	The east of the corridor section is within SPZ 1, and the west of the corridor section is within SPZ 2. Mitigation will be required to ensure there are no impacts to groundwater during construction. The corridor section crosses multiple rivers along the corridor section but these are not sensitive, standard mitigation will be required to ensure impacts to the geomorphology of the watercourses are avoided and sediment supply is prevented. Trenchless crossing of watercourses would reduce these risks.
Flood Risk	South of Hipley, the corridor section runs through flood zone 2 and 3 for a distance of approximately 250 m, alongside the River Wallington. Trenchless crossing of the river can be utilised but this is unlikely to stretch across the length of the flood risk areas. South of the intersection, the corridor section runs adjacent to flood zone 2 and 3. In line with the sequential test, there are other corridor sections with less of an interface with high risk flood zones.
Geology and Soils	No impact on geologically designated sites. No sources of contamination within the corridor section have been identified. The length of the corridor section runs through Grade 4 agricultural land, based on the ALC. Grade 4 land is categorised as poor quality agricultural land. This land does not constitute the Best and Most Versatile (BMV) agricultural land, which falls in grades 1 to 3a.
Socio-economics	The corridor section intersects with Furzeley Golf Course. Construction of the pipeline could result in land take from the golf course. Construction through the solar farm will be complicated and compensation may be required if there is disruption to the operation of the site.
Planning	There is an existing solar farm within the corridor section at Furzeley Corner. The interface with this development would need to be agreed..
Special Category Land	There is concern around the potential land take at the golf course. Engagement will be required to agree arrangements during construction and potentially provision of replacement land. There are implications relating to construction of the pipeline through the solar farm. There is limited opportunity to route around the solar farm given this would involve routing through either ancient woodland to the south, or Furzeley Golf Course and land owned by the Department for Environment, Food and Rural Affairs (Defra) to the north.

Conclusion

- C.10.3 The intersection with the solar park at Furzeley Corner presented significant constructability risks, given there was no opportunity to route around this site as ancient woodland lies to the south. To the north lies Furzeley Golf Course and Defra owned land. Therefore, there would potentially be a need to provide replacement land as Crown land would be affected. There would be a potential need for extensive lengths of tunnelling or trenchless solutions.
- C.10.4 Another significant constraint was the proximity to ancient woodland at a pinch point in the corridor section, where there was potential for direct impacts. The NPSWRI required avoiding loss or deterioration of ancient woodland unless there are wholly exceptional reasons. To avoid this impact, a tunnel would be required given the depth and distance a trenchless solution would be needed for.

Permanent tunnel shafts would have a large land take impact, and a permanent access would be required. There is currently no road access to this location and therefore a route of approximately 1 km would be required. A tunnelled option would result in significant construction activity in the proximity of ancient woodland.

- C.10.5 Other constraints related to the presence of priority habitats and impacts on functionally linked habitat within the Portsmouth Harbour SPA and Ramsar, which were unavoidable.
- C.10.6 Due to the topography of this route, there was increased likelihood of requiring additional permanent AGP further along the route. As a result of the constructability challenges, environmental constraints and requirement for further permanent AGP, this corridor section was not progressed.

C.11 Corridor Section W

- C.11.1 Corridor Section W ran from Creech Farm west of Furzeley Corner before intersecting the B2177 and joining with Corridor Section R near Carmans Farm to the west.
- C.11.2 Maps of Corridor Section W can be viewed on Sheets 7 and 15 of the Book of Maps.

Table C-10: Corridor Section W constraints overview

Topic	Constraints
Constructability	<p>At the east of the corridor section, a crossing of Trampers Lane is required. Given that this road is narrow, a road closure will be required. The corridor section will come into close proximity of residential properties on the west side of Trampers Lane and further west, on Firgrove Lane.</p> <p>Construction is required on Southwick Road (B2177) which is a busy road with various junctions. A lane closure would be required which would cause disruption. There is an off-road option north of North Boarhunt which could be utilised to reduce the distance construction is required on Southwick Road. West of Hundred Acres, there is an option for the corridor section to continue along Southwick Road to the junction with the A32 in Wickham, or route through open fields north of Southwick Road (within the South Downs National Park).</p> <p>Once the A32 has been crossed by both options, a crossing of the River Meon is required. Trenchless crossing would be required, and woodland would need to be cleared to allow for shaft construction.</p> <p>The original corridor section runs north adjacent to a disused railway, which is crossed at Northfields Farm House. There is an option to route west earlier which could be utilised to reduce the intersection with the South Downs National Park in this section. Trenchless crossing of the disused railway will be required for both options.</p>
Hydraulics	<p>The corridor section is constrained by the Forest of Bere and residential properties, which forces the corridor section through undesirable changes in elevation, including a local high point in the centre of the corridor section, as well as a number of bends which is hydraulically undesirable, leading to higher energy losses. The corridor section crosses the Meon Valley to the west where there is a steep level change. An IPS is required before the elevation increase within this corridor section.</p>

Topic	Constraints
Landscape	<p>This corridor section intersects the South Downs National Park. Given the NPSWRI requires looking at options to develop the Project outside of the National Park in the first instance, the intersection presents significant risks to the consentability of this corridor section. Given there are other corridor sections that do not intersect the National Park, these should be preferred over this corridor section.</p> <p>There is difficulty in identifying alternatives as part of this corridor section that go outside of the South Downs National Park, as the South Downs National Park is adjacent to Wickham. Therefore, an alternative route would have to divert around Wickham.</p>
Ecology	<p>The corridor section crosses the River Meon which is upstream of the Southampton and Solent Water Ramsar. It is also compensatory habitat under a Southern Water drought scheme being delivered separate to this Project. Any hydrological impacts to the River Meon could potentially impact the Ramsar site. Trenchless crossing of the River Meon would reduce the potential for impacts on it, and if it is extended across the floodplain grazing marsh then it can avoid impacts to this functionally linked habitat adjacent to the river. Further assessment is required to ensure trenchless crossing of the River Meon would not pose hydrogeological impacts to the watercourse or the functionally linked floodplain grazing marsh.</p> <p>There is potential for habitat losses within this corridor section associated with the corridor section intersecting priority habitats, the South Downs National Park and SINCs. Land take from these sites should be reduced.</p>
Heritage	<p>The corridor section is in the vicinity of grade II and II* listed buildings, however these are not within the corridor section. The southern corridor section which continues along Southwick Road to the A32 junction will be in closer proximity to listed buildings, including St Nicholas's Church (grade II* listed), as well as Wickham Conservation Area. Mitigation could be required for any potential settings impacts.</p> <p>Much of the corridor section traverses undeveloped land where there is potential for buried archaeology.</p>
Water Quality	<p>Trenchless crossing of the River Meon would reduce the potential for impacts to the hydrology and geomorphology of the river.</p> <p>The pipeline route would be preferred near the River Meon, as this keeps to the west of the corridor section, away from the floodplain.</p>
Flood Risk	<p>The corridor section crosses flood zone 3 when crossing the River Meon. Mitigation will be required to manage flood risk.</p>
Geology and Soils	<p>No impact to geologically designated sites.</p> <p>The northern off-road route at North Boarhunt is preferred over routing on the road and the option to route west out of the South Downs National Park earlier is preferred to avoid closed permitted landfill to the north of the other route.</p>
Socio-economics	<p>Avoiding the B2177 would be preferred by either routing north or south given the disruption that would be caused through construction on this busy route.</p> <p>If the southern corridor section option along Southwick Road to the A32 junction in Wickham is followed, access to St Nicholas Church would be impacted.</p>
Planning	<p>Given the intersection of the corridor with the South Downs National Park, and the requirements of the NPSWRI, an alternative corridor section should be progressed.</p>

Topic	Constraints
Special Category Land	There are playing fields and allotments in North Boarhunt that should be avoided if possible. Routing south of the B2177 would involve routing through Wickham Common, an area of common land. Under the Commons Act 2006, areas of common land are safeguarded to ensure the special qualities of the land are protected.

Conclusion

- C.11.3 There were significant constraints related to the intersection with the South Downs National Park, which is afforded significant protection in the NPSWRI. Given that there are other alternatives, this corridor section was not progressed.

C.12 Corridor Section N

- C.12.1 Corridor Section N was an alternative to Corridor Section W which routed through the South Downs National Park from Corridor Section S to Corridor Section V.
- C.12.2 Maps of Corridor Section N can be viewed in Sheet 5, 6 and 14 of the Book of Maps.

Table C-11: Corridor Section N constraints overview

Topic	Constraints
Constructability	This corridor section is located in mostly open agricultural land which lends itself to an open-cut method. Along the corridor section there are minor and busy roads for the pipeline to cross, which can be constructed using open-cut with a full road closure for the minor roads, and a lane closure for the major roads of suitable width. There are numerous locations where HV overhead cables are present so the route would need to be selected to mitigate the risk of crossing these. For the northern option, the River Meon would need to be crossed using a pipe jack technique due to the distance of the crossing, with a shaft constructed either side of the river. The western shaft would be situated in Wickham Park Golf Course.
Hydraulics	This corridor section is hydraulically similar to the Corridor Section W, in that the pipeline will pass over a local high point in between the River Wallington valley and the River Meon valley. A key difference is that this corridor section places the pipeline closer to the deepest parts of the River Wallington valley and runs alongside the River Wallington for some distance. Due to the relatively short distance to the start of the route, this key difference is unlikely to require additional intermediate pumping. However, it may increase the pressure requirements in some scenarios. A second key difference is this corridor section is predominantly routed through fields, avoiding the requirement for a large number of pipeline bends as found within Corridor Section W which is routed via the road network in parts, this may alleviate some of the pressure requirements.
Landscape	The corridor section intersects the previously local designated landscape of Winchester (now considered valued) Meon Valley, and Forest of Bere ASLQ, as well as the Forest of Bere East and Meon Valley LCAs. There is potential for temporary impacts to landscape defining features and tranquility as a result of construction activity.

Topic	Constraints
	<p>It also passes Allen King Way, and Pilgrims Trail Long Distance Path and ends next to the Meon Valley trail.</p> <p>This corridor section would be preferable to the Corridor Section W as it would avoid the South Downs National Park.</p> <p>There would also be a need to avoid areas of woodland.</p>
Ecology	<p>There are numerous large areas of deciduous and ancient woodland directly adjacent to the corridor section. There would be no direct impact if buffers between the woodland and the construction and operation of the pipeline are implemented.</p> <p>There are a number of SINC's adjacent to the corridor section. There would be no impact assumed if buffers are implemented.</p> <p>The corridor section crosses the River Meon, which is upstream of the Southampton and Solent Water Ramsar site. It is also compensatory habitat under the Southern Water drought scheme. Any hydrological impacts to the River Meon could potentially impact the Ramsar site. Trenchless crossing of the River Meon would reduce the potential for impacts on it, and if it is extended across the floodplain grazing marsh then it can avoid impacts to this functionally linked habitat adjacent to the river. Further assessment is required to ensure trenchless crossing of the River Meon would not pose hydrogeological impacts to the watercourse or the functionally linked floodplain grazing marsh.</p>
Heritage	<p>There are no nationally designated heritage assets within the corridor section. Three grade II listed buildings are located in and near to the corridor section. Further assessment is required to evaluate any impact and understand likely mitigation requirements.</p> <p>There are a number of non-designated heritage assets within the corridor section, where construction works have the potential to pose impacts to buried archaeology. Further assessment is required to identify risk.</p>
Water Quality	<p>There are potential impacts to water quality through sediment supply and contamination during construction on the River Wallington below Southwick, River Meon and an unnamed watercourse at Prior's Hold Farm. Best practice mitigation would be required to avoid impacts.</p> <p>Trenchless crossing of the River Meon will prevent geomorphological and hydrological impacts during construction.</p> <p>The south of the corridor section intersects SPZ 2c and 3 designated for the Maindell abstraction. There is potential for impacts to groundwater quality as a result of construction activity. Best practice measures would be required to avoid impacts.</p>
Flood Risk	<p>As a result of the watercourse crossings within the corridor section, the corridor section intersects flood zone 2 and 3 and is routed through this area for an extended distance. In accordance with the sequential test, other corridor sections should be progressed ahead of this corridor section. Consultation with the Environment Agency and local flood authority is required to identify detail flood risk of the area. A localised assessment of topography during the detailed design stage will assist in defining overland flow pathways.</p>
Geology and Soils	<p>No impact on geologically designated sites.</p> <p>There is potential to construction within areas of contamination to impact controlled waters within the corridor section. Ground investigation is required to identify the risk posed by any sources of contamination within or in proximity to the corridor section.</p>

Topic	Constraints
Socio-economics	The majority of the site is agricultural and therefore there are no major constraints. The crossing of the A32 may temporarily affect access to community services in Wickham
Planning	Pipeline corridor section runs adjacent to a mobile home park and a number of rural dwellings in the North Boarhunt and Wickham areas. Best construction practice measures should mitigate this impact.
Special Category Land	The west of the corridor section is designated as open space by Fareham Borough Council.

Conclusion

- C.12.3 This corridor section would route further south than the original corridor section, and therefore reduced the impact on the South Downs National Park. Mitigation would be required to avoid impacts to areas of woodlands and SINCS in this area. Trenchless crossing of the River Meon would be required to avoid sediment supply to the River Wallington. However, this option was considered preferable to Corridor Section W.
- C.12.4 The most significant constraint within this pipeline was the intersection with an area of high flood risk around the River Wallington. There were other corridor sections that had fewer intersections with high-risk flood areas, and in line with the sequential test within the NPSWRI these should be progressed above this corridor. As such, this corridor was not progressed.

C.13 Corridor Section T

- C.13.1 The corridor section links Corridor Section X and Corridor Section Q. It was within the South Downs National Park.
- C.13.2 The corridor section began at a point southeast of Furzeley Corner. It headed northwest along Forest Road and crosses Bunker's Hill. There was an option for the corridor section to route south of Forest Road through Creech Woods. The River Wallington was crossed in multiple locations by the corridor section.
- C.13.3 The south and west ends of the corridor section were within open fields where construction would be open-cut. At the east of the corridor section, open-cut would likely be difficult around Newlands Lane and Furzeley Golf Course as a result of a pond, drainage channels and residential properties.
- C.13.4 The corridor section was narrow in several sections as it routed through pinch points and along the road network. Therefore, a large number of pipeline bends will be required which is hydraulically undesirable, leading to higher energy losses.
- C.13.5 The corridor section cut through the area where the two sides of Furzeley Golf Course meet at Furzeley Road. There was potential for land take from the golf course and impacts to the access.
- C.13.6 Maps of Corridor Section T can be viewed in Sheet 13 and 14 of the Book of Maps.

Table C-12: Corridor Section T constraints overview

Topic	Constraints
Constructability	<p>The south and west ends of the corridor section are through open fields where construction can be open-cut. At the east of the corridor section, open-cut may be difficult around Newlands Lane and Furzeley Golf Course as a result of a pond, drainage channels and residential properties.</p> <p>The central section of the corridor section passes Creech Woods, there are two corridor section options, the first cuts through Creech Woods between Furzeley Road and Bunkers Hill, the second routes north of Creech Woods, along Forest Road south of Denmead. The first option through Creech Woods could not be constructed open-cut, given the limited clearance provided by the woodland, and therefore the section would need to be tunnelled. This route would also result in disruption to road users and residents on Bunkers Hill.</p> <p>The second route option would require construction within Forest Road, which is a busy route on a narrow road. There are locations where fields south of the road could be used, but road closures may be required at certain pinch points.</p>
Hydraulics	<p>Creech Woods is located on a localised hill and avoiding this area reduces the level of elevation change across the corridor section. There is a low level of elevation change throughout the remainder of the corridor section.</p> <p>The corridor section is narrow in several areas as it is routed through pinch points and along the road network. Therefore, a large number of pipeline bends will be required which will be hydraulically undesirable, leading to higher energy losses.</p>
Landscape	<p>There is potential for the loss of woodland and trees throughout the corridor section which define the character Forest of Bere LCA. The pipeline route should be sited so that it avoids the removal of trees.</p> <p>Construction activities could adversely impact the visual amenity of residential receptors in the proximity of the corridor section.</p> <p>Users of the Allan King Way and Wayfarer's Walk long distance routes could experience a disruption to the views during construction.</p> <p>There is 1 TPO group and 16 individual TPO trees located on the boundary of the corridor section. These areas should be avoided by the pipeline route to avoid potential damage to trees.</p>
Ecology	<p>The River Wallington is crossed in multiple locations by the corridor section. The watercourse is upstream of Portsmouth Harbour SPA and Ramsar. Any potential impacts to the hydrology of the river could impact the designated sites within Portsmouth Harbour. Impacts can be reduced through trenchless crossings of watercourses and the adjacent floodplain grazing marshes designated as priority habitat.</p> <p>The corridor section through Creech Woods would intersect with Creech Walk East SINC. There is potential for a temporary loss of habitat.</p>
Heritage	<p>No impacts on any heritage assets within the corridor section. There is potential for buried archaeology in areas of open, undisturbed ground given their lack of development</p>
Water Quality	<p>There are four main river crossings within the corridor section. To avoid impacts on the hydrology and geomorphology of these rivers, trenchless crossings would be made.</p> <p>The corridor section is within SPZ 1 at Worlds End and Furzeley Corner. Mitigation will be required to ensure there are no impacts to groundwater during construction.</p>

Topic	Constraints
Flood Risk	The corridor section crosses flood zone 2 and 3 areas around river crossing sites, and the majority of the north corridor section along Forest Road is directly south of flood zone 2 and 3. In line with the sequential test referenced in the NPSWRI, other alternatives have less interfaces with high flood risk areas and therefore should be pursued above this corridor section.
Geology and Soils	No impact on geologically designated sites. No significant sources of contamination within or around the corridor section. Construction within the road sections could encounter sources of contamination.
Socio-economics	There is potential for disruption to residential properties to the south of Denmead adjacent to the corridor section route as a result of construction activity in the road network, which could result in likely indirect air quality, noise and vibration impacts. The corridor section cuts through the area where the two sides of Furzeley Golf Course meet at Furzeley Road. There is potential for land take from the golf course and impacts to the access. It would be preferred to reduce construction on Forest Road given the potential for significant disruption to this key route.
Planning	The corridor section intersects the Denmead Waterlooville Settlement Gap Policy Area designated by the Denmead Neighbourhood Plan. Construction should aim to limit impacts to the rural character of this area.
Special Category Land	The corridor section route through Creech Woods intersects land owned by Defra and is Crown Land. Given the potential for disruption to Furzeley Golf Course, which has been identified as green space, consultation will be required to identify suitable arrangements during construction.

Conclusion

- C.13.7 There were constructability challenges in this corridor section in relation to in-road works. Routing south of Forest Road through Creech Woods would result in adverse ecology and landscape impacts. Additionally, Creech Woods is owned by Defra. The alternative to this was routing along Forest Road south of Denmead, which could require road closure which will generate disruption to the road network posing impacts for the wider community in this area. This corridor section would also result in a route directly into the South Downs National Park and for this reason this corridor section was not progressed.

C.14 Corridor Section X

- C.14.1 The corridor section linked Corridor Section S or T to Corridor Section Z. Part of the corridor section intersected with the South Downs National Park between Budden's Lane and Bishop's Wood Road.
- C.14.2 The corridor section began at Newtown and heads north-west and crossed Hundred Acres Road. It continued north-west, following Liberty Road and Heath Road, crossed the A32 west of Soberton Heath, the River Meon, the Winchester Road (B2177), the River Hamble and joined Corridor Section Z at a point south west of Walthams Cross.

- C.14.3 At the southeast of the corridor section, there were two corridor section sub-options that had developed through Newtown:
- Option X1 routed along Church Road, which is a narrow road passing a church and a school, and a road closure would potentially be required. It runs close to overhead power lines and tracks the route of a watercourse which drains into a sensitive system related to the River Hamble. A proposal to move this further east would encroach on playing fields in Newtown
 - Option X2 crossed Church Road and routes west across open fields, crossing Hundred Acres Road and routing north to Liberty Road.
- C.14.4 After the corridor section crossed the Winchester Road (B2177), two corridor section sub-options were developed:
- X3 routed south along Bishop’s Wood Road and Forest Road. This would pose disruption to this road route.
 - X4 routed north, south of Swanmore, and crossed open fields however the elevation changes as a result of a hill to the north. This would cross a playing field in Swanmore.
- C.14.5 Maps of Corridor Section X can be viewed on Sheets 8, 9, 15 and 16 of the Book of Maps.

Table C-13: Corridor Section X constraints overview

Topic	Constraints
Constructability	<p>At the south-east of the corridor section, there are two route options through Newtown. One option routes along Church Road, which is a narrow road passing a church and a school. A road closure will be required. The second option crosses Church Road and routes west across open fields, crossing Hundred Acres Road and routing north to Liberty Road where this options joins back to the first option.</p> <p>The route follows Liberty Road and Heath Road, which are narrow roads where road closures would be required to accommodate construction work. There is a significant level difference between Heath Road to the A32, open-cut would be difficult as a result of the topography. A road closure would be required on Budden’s Lane.</p> <p>At the end of Budden’s Lane, the corridor section crosses a disused railway line and the A32, which are at different levels. Construction would need to take place under the railway. There is limited place for shafts as a result of woodland and residential properties.</p> <p>A trenchless crossing of the River Meon is required west of the A32.</p> <p>East of Waltham Chase, there are two options for the pipeline route. The first option routes south along Bishop’s Wood Road and Forest Road. This would pose disruption to this road route. The second option routes north, south of Swanmore, is across open fields. This would cross public open space in Swanmore.</p> <p>The north-west of the corridor section requires trenchless crossing of the River Hamble. The route will need to be sited to avoid intersections with overhead pylons.</p> <p>The west of the corridor section, after the Meon Valley is less constrained allowing for greater flexibility in pipeline routing</p>
Hydraulics	<p>The east of the corridor section follows the local road network, which will require several bends and is undesirable for hydraulics. The corridor section</p>

Topic	Constraints
	<p>reaches the highest point of the northern corridor section routes.</p> <p>South of Bishop's Waltham, the southern corridor section option would be preferred to avoid elevation changes as a result of a hill to the north.</p> <p>An IPS will be required in the middle of the corridor section to lift flows from the Meon Valley after gravitating from BPT- 3.</p>
Landscape	<p>The corridor section will intersect the South Downs National Park for a section along Budden's Lane and Bishop's Wood Road.</p> <p>The NPSWRI requires the National Park to be avoided unless there are exceptional circumstances. Given there are other corridor sections that do not intersect the National Park, these should be preferred over this corridor section.</p> <p>There are 3 TPO groups and 5 individual TPO trees within the corridor section. Construction works should avoid the removal of these trees.</p>
Ecology	<p>There are a number of large areas of ancient woodland adjacent to the corridor section within the South Downs National Park. Construction works should not result in the loss of any areas of ancient woodland.</p> <p>The corridor section crosses the River Hamble which is upstream of the Solent and Southampton Water Ramsar. Hydrological impacts to the river have the potential to indirectly impact the Ramsar site. The corridor section also intersects with floodplain grazing marsh associated with the River Hamble and River Meon. Trenchless crossing of the river will avoid impacts. The River Meon is also compensatory habitat under a Southern Water drought scheme being delivered separate to this project. Any hydrological impacts to the River Meon could potentially impact the Ramsar site.</p> <p>Trenchless crossing of the River Meon would reduce the potential for impacts on it, and if it is extended across the floodplain grazing marsh then it can avoid impacts to this functionally linked habitat adjacent to the river. Further assessment is required to ensure trenchless crossing of the River Meon would not pose hydrogeological impacts to the watercourse or the functionally linked floodplain grazing marsh. Turtle Dove population(s) have been identified within the corridor section. Removal of dense hedgerows and scrub within the proximity of these areas should be avoided.</p> <p>There is potential for significant populations of barbastelle bats within the Meon Valley and Bere Forest. Loss of habitats as a result of construction will impact these protected species.</p> <p>The corridor section intersects Bishops Waltham Branch Line Local Nature Reserve and a number of SINCs. There is potential for loss of habitats within these sites.</p>
Heritage	<p>There are no designated heritage assets within the corridor section.</p> <p>Bishop's Waltham Palace and Fishponds Scheduled Monument, and the wider Bishop's Waltham conservation area is adjacent to the northwest of the corridor section. There are potential for impacts relating to the setting of these assets and buried archaeology.</p> <p>There is potential for buried archaeology around water crossings within the corridor section.</p>
Water Quality	<p>There are several watercourse crossings within the corridor section. The most sensitive is the River Meon, which is a chalk river sensitive to sediment supply. Interaction with the river and its floodplain should be reduced through trenchless construction.</p>

Topic	Constraints
	<p>The corridor section crosses a SPZ 1 in Newtown and south of Soberton Heath. Mitigation will be required to ensure there are no impacts to groundwater during construction.</p> <p>The River Hamble requires crossing, and a branch of this river is crossed multiple times by this corridor section south of Bishop's Waltham. Trenchless construction may be required for longer sections within this wetland area.</p>
Flood Risk	<p>The corridor section intersects flood zone 3 when crossing the River Meon, the River Hamble and a larger wetland area south of Swanmore. Flood risk will need to be managed during construction.</p>
Geology and Soils	<p>There is a water treatment works historic landfill adjacent to the west of Bishops Waltham Railway Path within the corridor section. Ground investigation would be due to proximity of the landfill and the potential for contamination.</p> <p>South of Bishop's Waltham, the southern option is preferred to avoid potential contamination associated with a water treatment works within the northern option.</p>
Socio-economics	<p>The church and school on Church Road in Newtown will be significantly impacted if road closures are required.</p> <p>There is potential for significant disruption to the local community as a result of road closures on Liberty Road and Heath Road.</p> <p>The corridor section crosses a playing field south of Swanmore. Mitigation through routing to avoid this site is required.</p>
Planning	<p>There are allocated housing sites that have been developed at Swanmore, therefore there are sensitive residential receptors in this area.</p> <p>The corridor section runs in close proximity to developed housing allocation south of Bishop's Waltham.</p> <p>The corridor section crosses the site of an application for a solar farm south of Bishop's Waltham. The northern route is preferred to avoid this potential future development.</p>
Special Category Land	<p>Public open space will be impacted at the playing fields in Swanmore.</p>

Conclusion

- C.14.6 There were significant constraints related to the intersection with the South Downs National Park. The NPSWRI requires development of the Project outside of the National Park in the first instance, therefore, this corridor section was not progressed as there were other alternatives available outside of the National Park.
- C.14.7 Additionally, there were significant constraints related to ecology and constructability within this corridor section.

Above Ground Plant Zones Evaluation Outcomes

- C.14.8 The Book of Maps as presented at the Summer 2022 Consultation can be found at the end of this appendix, which shows the AGP zones described below.

C.15 Intermediate Pumping Station 1 Zone

- C.15.1 For routes through Corridor Sections S, W and Y, an IPS at either this location or the IPS-5 Zone would be required.
- C.15.2 The pumping station would need to be located at the east of Corridor Section W to account for the level changes at the west of the corridor section.
- C.15.3 The zone was located directly adjacent to the Goathouse Complex Site of Importance for Nature Conservation between an ancient woodland (Goathouse Coppice) and Goathouse Farm House. The zone was within the Forest of Bere LCA and is in the proximity of the River Wallington.
- C.15.4 The zone for IPS-1 can be seen in Sheet 16 of the Book of Maps.

Table C-14: Intermediate Pumping Station 1 Zone constraints overview

Topic	Constraints
Constructability	<p>Constrained area between an ancient woodland (Goathouse Coppice) and Goathouse Farm house, which is further restricted by the need to avoid 15 metre protection zone.</p> <p>Access route would need to be created from Goathouse/Trampers Lane. For construction this would probably have to be separate to the farm house access road.</p> <p>During construction, traffic management may be necessary as Goathouse/Trampers Lane is very narrow.</p>
Hydraulics	<p>For routes through Corridor Sections S, W and Y, an IPS at either this location, or the IPS-5 zone will be required.</p> <p>The pumping station is located at the east of the corridor section to account for the level changes at the west of the corridor section.</p>
Landscape	<p>The site is immediately adjacent to the boundary of the South Downs National Park and could therefore potentially affect its setting. The NPSWRI requires development to avoid compromising the purposes of nationally designated areas, and such projects should be designed sensitively.</p> <p>The site is within the Forest of Bere LCA, which is noted for its tranquillity, and therefore there is potential for construction activity to impact on the tranquillity of the area.</p>
Ecology	<p>There is potential for damage or loss of ancient woodland trees directly adjacent to the site. Mitigation is required during construction to avoid any potential damage to ancient woodland.</p> <p>Goathouse Complex SINC is directly adjacent to the site. Standard mitigation and construction buffers are required to avoid impacts to this site through construction pollution.</p>
Heritage	No issues of note.
Water Quality	The site is in the proximity of the River Wallington, therefore the supply of sediments and contaminants should be avoided during construction.
Flood Risk	No issues of note.
Geology and Soils	No issues of note.
Socio-economics	No issues of note.

Topic	Constraints
Planning	No issues of note.
Special Category Land	No issues of note.

Conclusion

C.15.5 The site was located immediately adjacent to the South Downs National Park and could therefore affect its setting. The NPSWRI requires development to avoid impacts when located outside the boundary of a National Park. There was also proximity to ancient woodland and a SINC. This site was not progressed.

C.16 Intermediate Pumping Station 2 Zone

C.16.1 This pumping station in Corridor Section X would be required to lift flows after the BPT further east in the corridor section. Moving the pumping station along the corridor section in either direction may increase the lift requirement due to local changes in elevation.

C.16.2 The pumping station was located at the east of the corridor section to account for the level changes at the west of the corridor section.

C.16.3 The zone was located directly South of Hillpound between Gravel Hill and Mislingford Road within the Forest of Bere West LCA and within the setting of the South Downs National Park.

C.16.4 Overhead high voltage cables run across the North of this zone and ancient woodland trees are adjacent to the zone. Users of the Pilgrims Trail would overlook the zone.

C.16.5 The zone was within the River Hamble Urban Waste Water Treatment Directive Catchment and was in the proximity of the Moors Stream.

C.16.6 The zone for IPS-2 can be seen in Sheet 15 of the Book of Maps.

Table C-15: Intermediate Pumping Station 2 Zone constraints overview

Topic	Constraints
Constructability	Access route from Gravel Hill, Mislingford Road or Bishop's Wood Road and would need to give adequate vision for entering and exiting. Overhead high voltage cables running across the North of this zone would mean the IPS would need to be built in the southern section. Permanent access and road would need to be constructed.
Hydraulics	This pumping station is required to lift flows after the BPT further east in the corridor section. Moving the pumping station along the corridor section in either direction may increase the lift requirement due to local changes in elevation.
Landscape	The site is within proximity to the South Downs National Park. The corridor section is within the Forest of Bere West LCA, and construction could impact the landscape through loss of woodland and the addition of a new built form.

Topic	Constraints
	There is potential for impacts to the views of residents on Orchardlea, Gravel Hill and Misingford Road, as well as the views from Pilgrims Trail.
Ecology	There is potential for loss of lowland mixed deciduous woodland priority habitat within the site. The pumping station should be sited to avoid this area. There is potential for damage or loss of ancient woodland trees directly adjacent to the site. Mitigation is required during construction to avoid any potential damage to ancient woodland.
Heritage	No issues of note
Water Quality	The site is in the proximity of the Moors Stream. Construction works should avoid the supply of sediment and contaminants into the river. The site is within the River Hamble Urban Waste Water Treatment Directive Catchment. Waste water and surface water during construction should be managed through standard mitigation.
Flood Risk	No issues of note
Geology and Soils	No issues of note
Socio-economics	The pumping station zone is adjacent to residential receptors on Orchardlea. Siting the pumping station away from these receptors would avoid potential impacts.
Planning	No issues of note
Special Category Land	No issues of note

Conclusion

C.16.7 This site was within proximity to the National Park with the potential to effect its setting. The site also had the potential for impacts on ancient woodland directly adjacent to it. Given there were better performing corridor sections available, this site was not progressed.

C.17 Intermediate Pumping Station 3 Zone

C.17.1 IPS-3 was one option for the IPS required in Corridor Section V.

C.17.2 The zone for IPS-3 can be seen in Sheet 7 of the Book of Maps.

Table C-16: Intermediate Pumping Station 3 Zone constraints overview

Topic	Constraints
Constructability	Open agricultural land, straight forward access route from Titchfield Lane although access would need to give adequate vision for entering and exiting. During construction traffic management may be necessary as Titchfield Lane is fairly narrow and quite busy.
Hydraulics	If a smaller pipeline diameter option is chosen, or the BPT in Corridor Section R cannot be sited in an optimal location, an IPS may be required to lift flows from the low point of the of the unavoidable Meon Valley crossing. An IPS may not be required in this corridor section if a larger pipeline diameter option is chosen.

Topic	Constraints
Landscape	The corridor section is within the Forest of Bere LCA, characterised by its woodland area. During construction, loss of woodland should be avoided. There is potential for limited adverse impacts to the visual amenity of residential receptors on Titchfield Lane. The pumping station should be sited so impacts are reduced.
Ecology	No constraints identified
Heritage	Little Park Mansions grade II listed is directly south of the zone. Construction and operation of the site could impact the setting and character of this asset. The Chichester to Betterne Roman road runs directly adjacent to the south of the site. There is potential for buried archaeology in this area. Therefore, further assessment is required to assess risks.
Water Quality	The site is within the Hamble Estuary Urban Waste Water Treatment Directive Catchment. Waste water and surface water during construction should be managed through standard mitigation.
Flood Risk	No constraints identified
Geology and Soils	No constraints identified
Planning	No constraints identified
Socio-economics	No constraints identified
Special Category Land	No constraints identified

Conclusion

- C.17.3 There is a Roman road in the immediate proximity of the site. Therefore, there was potential for buried archaeology within the site. Detailed siting within this zone should seek to maximise the distance between residential properties and infrastructure, and reduce any loss of woodland. There are no significant environmental impacts associated with this site and therefore the IPS-3 Zone was taken forward.

C.18 Intermediate Pumping Station 4 Zone

- C.18.1 IPS-4 was the alternative IPS to IPS-3 in Corridor Section V.
C.18.2 The zone for IPS-4 is shown on Sheet 7 of the Book of Maps.

Table C-17: Intermediate Pumping Station 4 Zone constraints overview

Topic	Constraints
Constructability	Open agricultural land, straight forward access route from Titchfield Lane although access would need to give adequate vision for entering and exiting. Siting of access point would need to be carefully positioned due to the junction opposite and various smaller road junctions in vicinity. During construction traffic management may be necessary as Titchfield Lane is fairly narrow and quite busy.

Topic	Constraints
Hydraulics	If a smaller pipeline diameter option is chosen, or the BPT in Corridor Section R cannot be sited in an optimal location, an IPS may be required to lift flows from the low point of the of the unavoidable Meon Valley crossing. An IPS may not be required in this corridor section if a larger pipeline diameter option is chosen.
Landscape	The site is within a valued landscape (previous Winchester Lower Meon Valley ASLQ). This area is described as a wooded enclosed landscape. Construction footprint should be reduced to avoid the potential for loss of woodland and trees which define the landscape quality and character. There is potential for adverse impacts to the visual amenity of residential receptors on Titchfield Lane. The pumping station should be sited so impacts are reduced.
Ecology	Quob Copse SINC is within 30 metres of the site. Standard mitigation is required to avoid impacts to this site through construction pollution.
Heritage	Little Tapnage Farmhouse grade II listed is directly south of the zone. Construction and operation of the site could impact the setting and character of this asset.
Water Quality	The site is approximately 500 m from the River Meon, which is a chalk river sensitive to fine sediment supply and contaminants. Mitigation is required to avoid the polluting of this watercourse during construction.
Flood Risk	No constraints identified.
Geology and Soils	The Quob Copse historic landfill is located adjacent to the site. There is potential for the mobilisation of contaminants during construction works.
Planning	No constraints identified.
Socio-economics	No constraints identified.
Special Category Land	No constraints identified.

Conclusion

- C.18.3 This site was adjacent to a landfill site and therefore there is potential for ground contamination constraints that would require appropriate controls and mitigation. A Grade II Listed farmhouse lies to the south. It would be preferable to site away from the nearby residential receptors to reduce impacts on residential properties. There were no significant impacts associated with this site and therefore the IPS-4 zone was taken forward.

C.19 Intermediate Pumping Station 5 Zone

- C.19.1 IPS-5 was an IPS within Corridor Section Y. It would only be required for routes through Corridor Sections S, W and Y.
- C.19.2 The zone for IPS-5 is shown on Sheet 7 of the Book of Maps.

Table C-18: Intermediate Pumping Station 5 Zone constraints overview

Topic	Constraints
Constructability	Straight forward access route from Curdrige Lane, although access would need to give adequate vision for entering and exiting. During construction, traffic management may be necessary as Curdrige Lane is fairly narrow and quite busy. Permanent access and road would need to be constructed.
Hydraulics	For routes through Corridor Sections S, W and Y, an IPS is required at either this location or the IPS-1 zone.
Landscape	There is potential for impacts to farmland and field boundaries which contribute to the Forest of Bere West LCA. Construction footprint and loss of these features should be reduced. There is potential for limited impacts to the views of residential receptors on Curdrige Lane during construction and operation.
Ecology	No constraints identified
Heritage	Goodman's Farmhouse grade II listed building is adjacent to the site to the east. There is potential for impacts to the setting and character.
Water Quality	The site is in the proximity of the river Hamble, therefore the supply of sediments and contaminants should be avoided during construction. The site is within the River Hamble Urban Waste Water Treatment Directive Catchment. Waste water and surface water during construction should be managed through standard mitigation.
Flood Risk	No constraints identified
Geology and Soils	There is a former sandpit at the site location which is not designated as a landfill. The ground may have been backfilled with unknown material where there will be potential for contamination. The site is adjacent to an industrial estate where there may be existing sources of contamination.
Planning	No constraints identified
Socio-economics	No constraints identified
Special Category Land	No constraints identified

Conclusions

- C.19.3 Limited constraints were identified with the exception of potential limitations related to siting and design, due to the proximity of residential receptors and a Grade II Listed Building. Potential contamination risks and the proximity of the River Hamble would need to be managed through appropriate environmental controls. This site was not progressed as it was not required for the corridor sections taken forward as part of the preferred option.

C.20 Break Pressure Tank 1 Zone

- C.20.1 BPT-1 was one option for the BPT that is required in Corridor Section R.
C.20.2 The zone for BPT-1 can be seen in Sheet 3 of the Book of Maps.

Table C-19: Break Pressure Tank 1 Zone constraints overview

Topic	Constraints
Constructability	Temporary and permanent access would potentially pass through an existing Portsmouth Water underground raised reservoir site located north of Portsdown Hill Road, although some alterations to the junction would be required. Natural slope of the ground lends itself to cutting into the slope and shielding any above ground structures from view.
Hydraulics	This is the first highest point along the preferred corridor and potentially the highest point throughout the corridor sections. As such, this location is conducive to the siting of a BPT. The elevation at this point is sufficient to enable gravity flows for the remainder of the downstream pipeline through Corridor Sections R and V. This presents the opportunity to significantly reduce pumping costs and improve hydraulic control of the system.
Landscape	The site is located on an elevated exposed east-west ridge. Long panoramic views over the Forest of Bere are visible from this location. Construction and operation of the BPT has the potential to result in impacts to landscape defining features. However, minimising construction footprint will reduce the extent of impacts. The site is intersected by Wayfarers Walk long distance route. There is potential for impacts on views from this route.
Ecology	Portsdown SSSI is within 100 m of the BPT. There is potential for impacts through air and waterborne pollution.
Heritage	The Fort Widley Scheduled Monument is located to the west of the BPT zone. Construction and operation of the BPT could impact the setting of the fort and any buried archaeology in the area.
Water Quality	There is potential for supply of sediment and contaminants as the site is within the catchment of the Potwell Tributary, posing an impact to the water quality of these water bodies.
Flood Risk	No constraints identified
Geology and Soils	No constraints identified
Planning	The site is located within Portsdown Hill open space area adopted by Portsmouth Local Plan.
Socio-economics	No constraints identified
Special Category Land	The site is located within Portsdown Hill open space area adopted by Portsmouth Local Plan.

Conclusion

- C.20.3 This site was optimum from a hydraulics perspective although there were potential constraints associated with heritage, landscape and open space constraints which should be considered in further detail. Further work would need to be undertaken to determine whether it is possible to adjust the siting of the BPT-1 to reduce impacts whilst optimising hydraulic viability.
- C.20.4 This site was taken forward as part of the preferred corridor.

C.21 Break Pressure Tank 2 Zone

- C.21.1 BPT-2 was the alternative to BPT-1 within Corridor Section R.
C.21.2 The zone for BPT-2 can be seen in Sheet 3, 4 and 5 of the Book of Maps.

Table C-20: Break Pressure Tank 2 Zone constraints overview

Topic	Constraints
Constructability	There is a direct access route from Portsdown Hill Road although access would need to give adequate vision for entering and exiting. Sites more exposed further to the West so will have impact on visuals unless all above ground structures are lowered out of sight.
Hydraulics	This is a high point along the corridor sections. The elevation at this point is sufficient to enable gravity flows for the remainder of the downstream pipeline and presents the same hydraulic advantages as per BPT-1.
Landscape	A section of the BPT zone to the west is within the Portsdown Hill ASLQ. There is potential for impacts to the 'high scenic quality' of this area. The BPT should be located to the east of the zone to avoid impacts to this designation. The site is located on an elevated exposed east-west ridge. Long panoramic views over the Forest of Bere visible from this location. Construction and operation of the BPT has the potential to result in impacts to landscape defining features, however, minimising construction footprint will reduce the extent of impacts. The Allan King Way and Pilgrim's Trail intersect the zone in two locations. There is potential for impact to views from these routes during construction and operation.
Ecology	There is potential for temporary disturbance to habitat functionally linked to the Chichester and Langstone Harbours Ramsar and SPA during construction. The BPT zone covers Crooked Walk Banks and Fort Widely and Surrounds SINC. There is potential for temporary disturbance from noise, visual and vibration during construction. Siting of the BPT should avoid the SINC areas.
Heritage	The BPT zone is adjacent to Fort Nelson, Fort Southwick, Fort Widley and World War II Heavy Anti-aircraft gun site Scheduled Monuments. The three forts are also grade I and II* listed buildings. If the BPT is to be sited in this zone, it should be sensitively sited so impacts on the setting and character of the heritage assets can be reduced during construction and operation. There is potential for buried archaeology within and around the BPT zone as a result of known non-designated heritage assets. Further assessment is required to identify high risk areas.
Water Quality	There is potential for supply of sediment and contaminants as the site is within the catchment of the Potwell Tributary and the River Wallington below Southwick, posing an impact to the water quality of these water bodies.
Flood Risk	No constraints identified
Geology and Soils	A section of the south of the BPT zone is on land where there is an underground oil storage reservoir, which is potentially still in use. Therefore, siting the BPT away from this area is preferable.
Planning	A small section at the south-eastern end of the site is located within Portsdown Hill open space area adopted by Portsmouth Local Plan.

Topic	Constraints
Socio-economics	No constraints identified
Special Category Land	Sections of the BPT zone is owned by the Ministry of Defence. This land should be avoided where possible.

Conclusion

C.21.3 There were several constraints across multiple topics within the zone, including impacts on landscape and views, nationally designated heritage assets, ecological features and a section which includes an underground oil storage reservoir, open space and Ministry of Defence owned land. Therefore, BPT Zone 1 was taken forwards and BPT Zone 2 was not progressed.

C.22 Break Pressure Tank 3 Zone

C.22.1 A BPT is likely required in Corridor Section X before this section descends towards the Meon Valley.

C.22.2 The zone was selected as it is at the highest point of the corridor section before being constrained by woodland. It would be hydraulically unfeasible to move the zone further south, as the outlet main would need to be laid deeper to enable gravity flow west of the corridor section.

C.22.3 The South Downs National Park was immediately adjacent to the site.

C.22.4 The zone for BPT-3 can be seen in Sheet 15 of the Book of Maps.

Table C-21: Break Pressure Tank 3 Zone constraints overview

Topic	Constraints
Constructability	An access route at Liberty Road would need to have adequate vision for entering and exiting. A permanent access would need to be constructed. During construction, traffic management would probably be required due to Liberty Road being narrow and not good visibility. Close proximity to the National Park would need to be carefully managed.
Hydraulics	A BPT is likely required in this corridor section before it towards the Meon Valley. The location of this BPT zone was selected as it is at the highest point of the corridor section before being constrained by woodland. It is hydraulically unfeasible to move this BPT zone further south, as the outlet main would need to be laid deeper to enable gravity flow west of the corridor section.
Landscape	The South Downs National Park is immediately adjacent to the site. There is potential for effects on the special qualities of the South Downs National Park. Construction works within the National Park and works that will pose indirect impacts should be avoided. There is potential for limited visual amenity impacts to properties in Liberty Road during construction.
Ecology	Given the proximity to the South Downs National Park, there is potential for indirect impacts to habitats within the National Park.

Topic	Constraints
	There is potential for damage or loss of ancient woodland trees directly adjacent to the site. Mitigation is required during construction to avoid any potential damage to ancient woodland. West Walk SINC is directly adjacent to the site. Standard mitigation and construction buffers are required to avoid impacts to this site through construction pollution.
Heritage	No issues of note
Water Quality	The site is in the proximity of the Upper Wallington. Construction works should avoid the supply of sediment and contaminants into the river.
Flood Risk	No issues of note
Geology and Soils	No issues of note
Socio-economics	No issues of note
Planning	No issues of note
Special Category Land	No issues of note

Conclusion

C.22.5 The NPSWRI affords the highest status of protection to National Parks in relation to landscape and scenic beauty. Given the potential for effects on the special qualities of the South Downs National Park, this zone was not progressed.

C.23 Break Pressure Tank 4 Zone

C.23.1 BPT-4 was one option for the BPT that is required in Corridor Section Z.

C.23.2 The zone for BPT-4 is shown on Sheet 9 of the Book of Maps.

Table C-22: Break Pressure Tank 4 Zone constraints overview

Topic	Constraints
Constructability	Only access via private road off Scivier's Lane. Permanent access and road would need to be constructed. Construction activities close to large residential houses/building so disruption would need to be mitigated carefully.
Hydraulics	This BPT is preferred over the BPT-5 zone, as it will provide a greater level of hydraulic control owing to its higher elevation. For routes through Corridor Sections R and V, if BPT-1 or BPT-2 are constructed in an optimal location and a larger pipeline diameter is used, a BPT may not be required in Corridor Section Z. If a BPT is required in Corridor Section Z, only one of BPT-4 or BPT-5 is needed.
Landscape	Construction should avoid the loss of parkland/pasture landscape features that contribute to the Forest of Bere West LCA. There is potential for moderate to large adverse impacts to the views of residential receptors on Sciviers Lane. Construction duration and footprint should be minimised to reduce impacts.

Topic	Constraints
Ecology	There is potential for the loss of lowland mixed deciduous woodland. The BPT should be sited to avoid these areas and provide appropriate construction buffers to avoid indirect impacts. Barbastelle bats have been identified within the site. Therefore, there is potential for the loss of species and habitats during construction. Loss of woodland should be avoided.
Heritage	No constraints identified
Water Quality	The site is in the proximity of the Upper Hamble and Horton Heath Stream, therefore the supply of sediments and contaminants should be avoided during construction. The site is within the River Hamble Urban Waste Water Treatment Directive Catchment. Waste water and surface water during construction should be managed through standard mitigation. The site is within SPZ 1 and 2 at Lower Upham. Mitigation would be required to ensure there are no impacts to groundwater as a result of construction on this site.
Flood Risk	No constraints identified
Geology and Soils	No constraints identified
Planning	No constraints identified
Socio-economics	No constraints identified
Special Category Land	No constraints identified

Conclusion

- C.23.3 There were limited constraints associated with this site based on current information, with the exception of the proximity of residential receptors. Further work would need to be undertaken to reduce impacts on residential receptors. This site was taken forward as part of the preferred corridor.

C.24 Break Pressure Tank 5 Zone

- C.24.1 BPT-5 was the alternative option for a BPT in Corridor Section Z.
C.24.2 The zone for BPT-5 is shown on Sheet 10 of the Book of Maps.

Table C-23: Break Pressure Tank 5 Zone constraints overview

Topic	Constraints
Constructability	Straight forward access route from B3354 although access would need to give adequate vision for entering and exiting and level difference between road and field dealt with. Permanent access and road would need to be constructed. Overhead high voltage cables in vicinity would need to be managed.
Hydraulics	This BPT provides a lower level of hydraulic control.

Topic	Constraints
	For routes through Corridor Sections R and V, if BPT-1 or BPT-2 are constructed in an optimal location and a larger pipe diameter is used, a BPT may not be required. If BPT-4 or BPT-5 are required, only one is needed.
Landscape	Construction should avoid the loss of pasture and field boundary landscape features that contribute to the Forest of Bere West LCA. There is potential for moderate to large adverse impacts to the views from Hillview Manor Park in Crowdhill which is adjacent to the site. Construction duration and footprint should be minimised to reduce impacts.
Ecology	There is potential for damage or loss of ancient woodland trees directly adjacent to the site.
Heritage	The Park Pale at Marwell Scheduled Monument is adjacent to the site. This is associated with further heritage assets at Marwell Manor. Construction and operation of the BPT has potential to impact the setting and character of the Scheduled Monument.
Water Quality	The site is in the proximity of Bow Lake, therefore the supply of sediments and contaminants should be avoided during construction. The site is within the River Itchen Urban Waste Water Treatment Directive Catchment. Waste water and surface water during construction should be managed through standard mitigation.
Flood Risk	No constraints identified
Geology and Soils	The site is located on Crowdhill historic landfill. Ground investigations are required to assess the contamination risk. It is likely that this will present a significant risk due to the potential industrial waste input.
Planning	No constraints identified
Socio-economics	No constraints identified
Special Category Land	No constraints identified

Conclusion

- C.24.3 Compared to the BPT-4 zone, this zone was considered to have a greater number of constraints particularly from a heritage, landscape, water and ecology perspective. This site was not progressed.

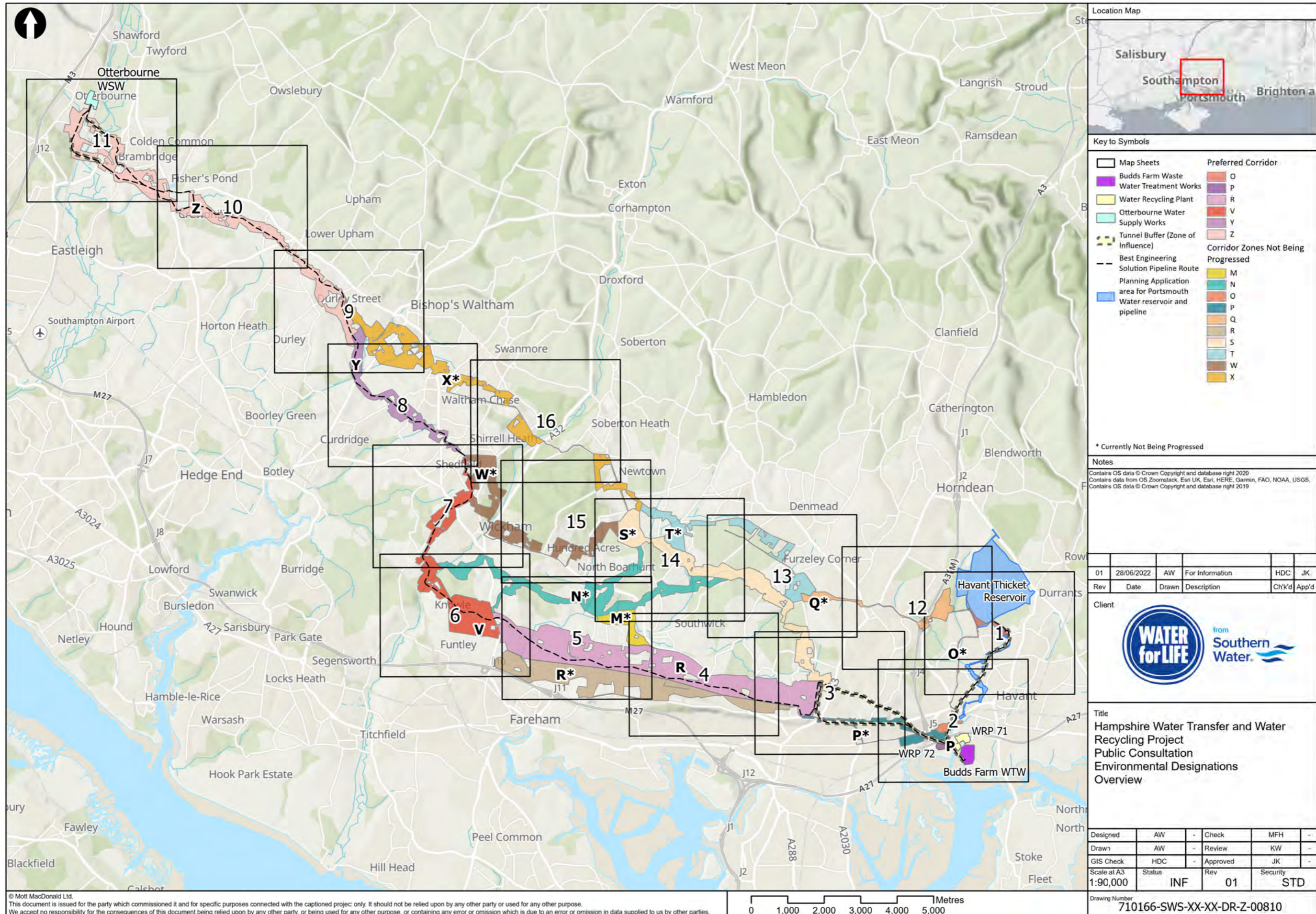
C.25 Corridor Section and Above Ground Plant Refinement Evaluation Conclusions

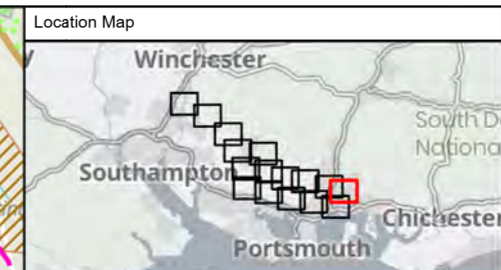
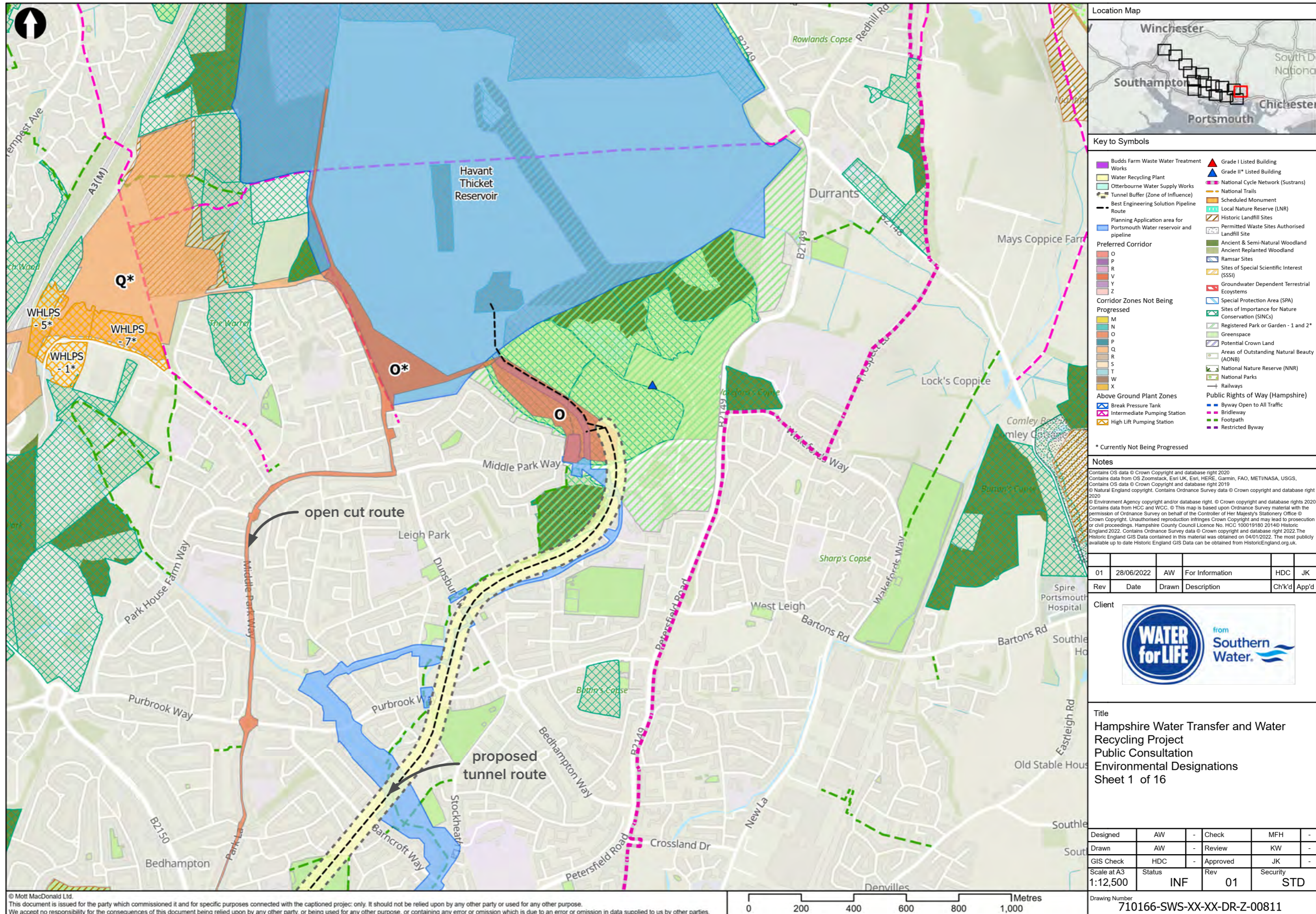
Summary of the Preferred Corridor

- C.25.1 Following the corridor section and AGP refinement evaluation, a preferred pipeline corridor was identified. The preferred corridor was selected to route outside of the National Park where possible, given that the NPSWRI affords the highest status of protection to National Parks in relation to landscape and scenic beauty, and required development of the Project outside of the National Park in the first instance. Part of Corridor Section Z (option Z3) was within the South Downs National Park. However, optionality had been provided (options Z3 and Z4) for

crossing the River Itchen which provided routes within and outside the South Downs National Park to acknowledge the other ecological constraints in this area. The preferred corridor also reduced the amount of permanent AGP that was required to accompany the pipeline.

- C.25.2 The preferred corridor proposed to utilise tunnelled routes through Corridor Sections O and P to avoid constructability challenges and reduce above ground construction activity, and likely impacts in close proximity to residential properties, where there is potential for indirect impacts on air quality, noise and vibration, and significant disruption to local roads within a densely populated urban area
- C.25.3 The preferred corridor passed through Corridor Section R. It was acknowledged that there could be possible landscape and heritage setting impacts associated with the Scheduled Monuments south of Corridor Section R. In light of this, a route further north in Corridor Section R could be utilised, however there was risk of requiring additional AGP along the pipeline by taking a more northerly route.





Key to Symbols

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Water Recycling Plant	Grade II* Listed Building
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Tunnel Buffer (Zone of Influence)	National Trails
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Permitted Water reservoir and pipeline	Permitted Waste Sites Authorised Landfill Site
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P	Ramsar Sites
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V	Groundwater Dependent Terrestrial Ecosystems
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Corridor Zones Not Being Progressed	Registered Park or Garden - 1 and 2*
M	GreenSpace
N	Potential Crown Land
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T	Byway Open to All Traffic
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Intermediate Pumping Station	
High Lift Pumping Station	

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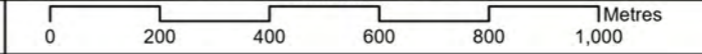


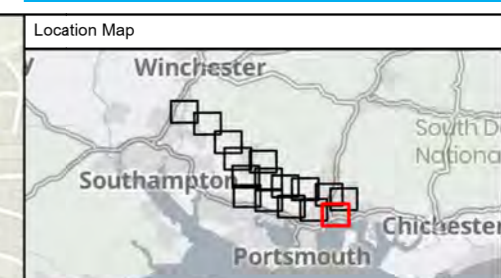
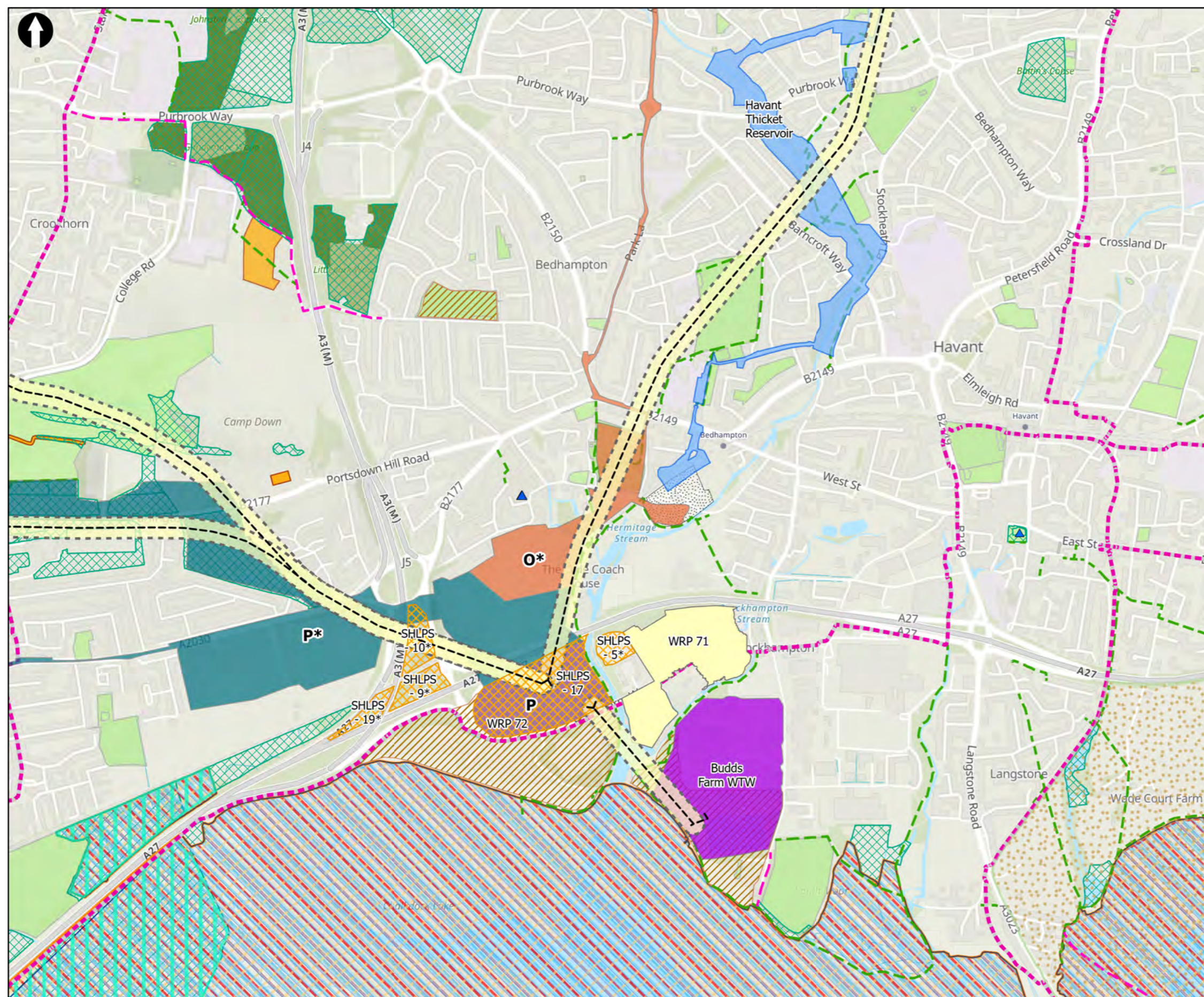
Title
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 Environmental Designations
 Sheet 1 of 16

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Drawn	AW	-	Review	KW	-
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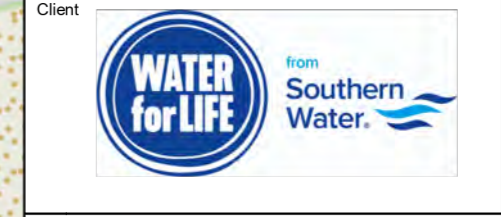
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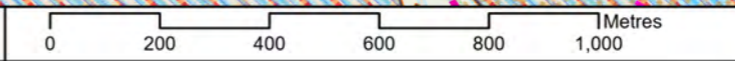
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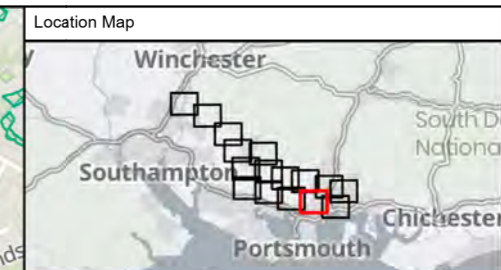
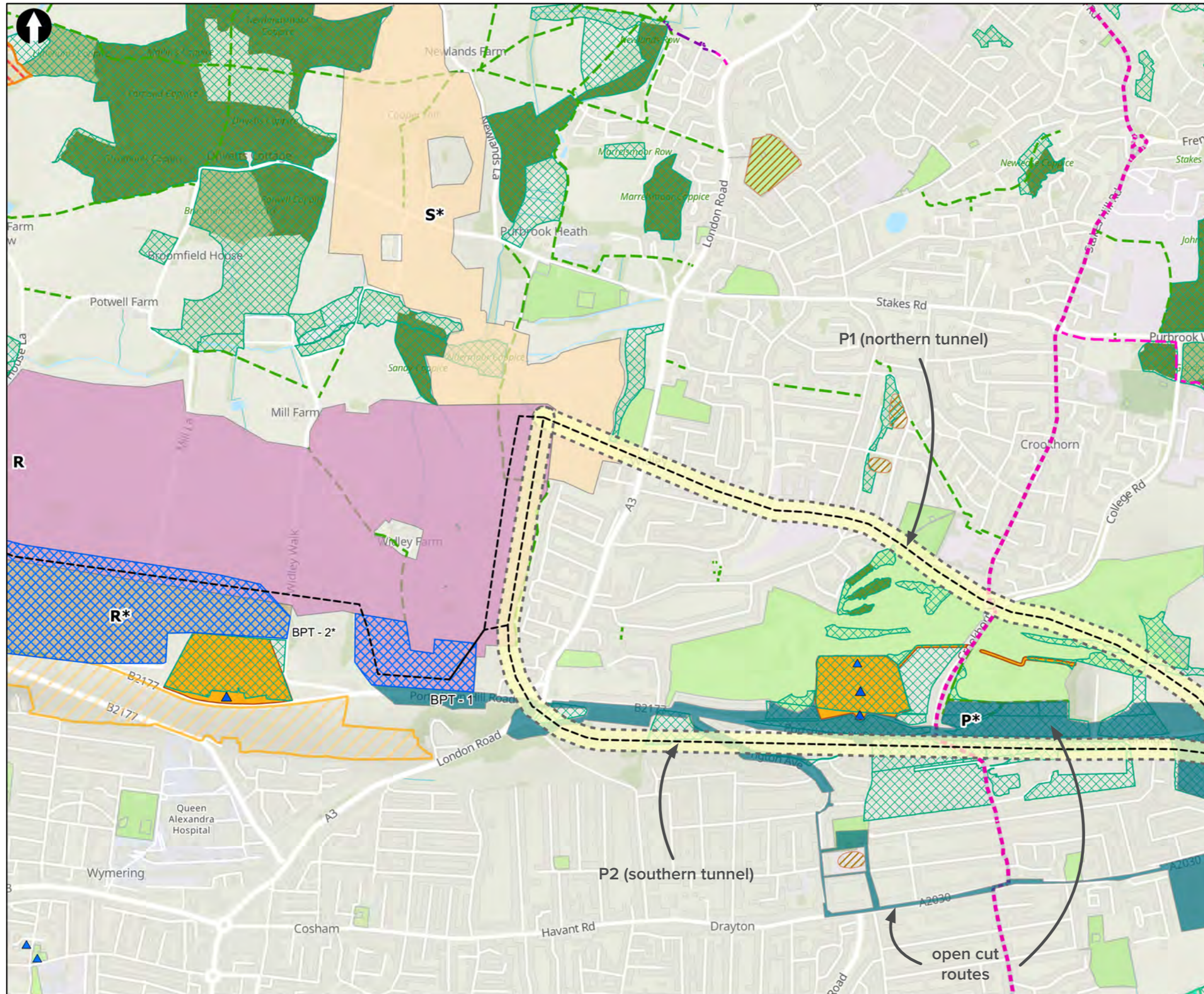
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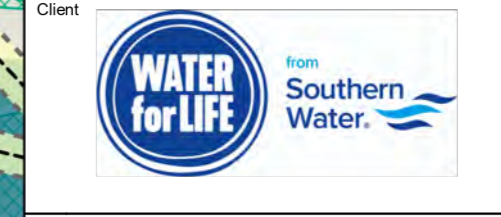
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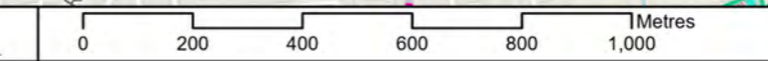


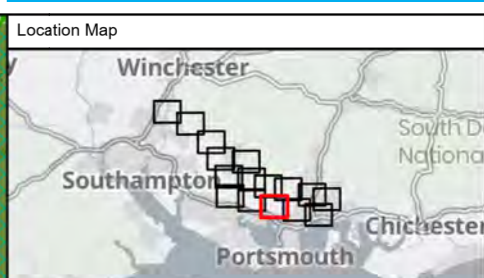
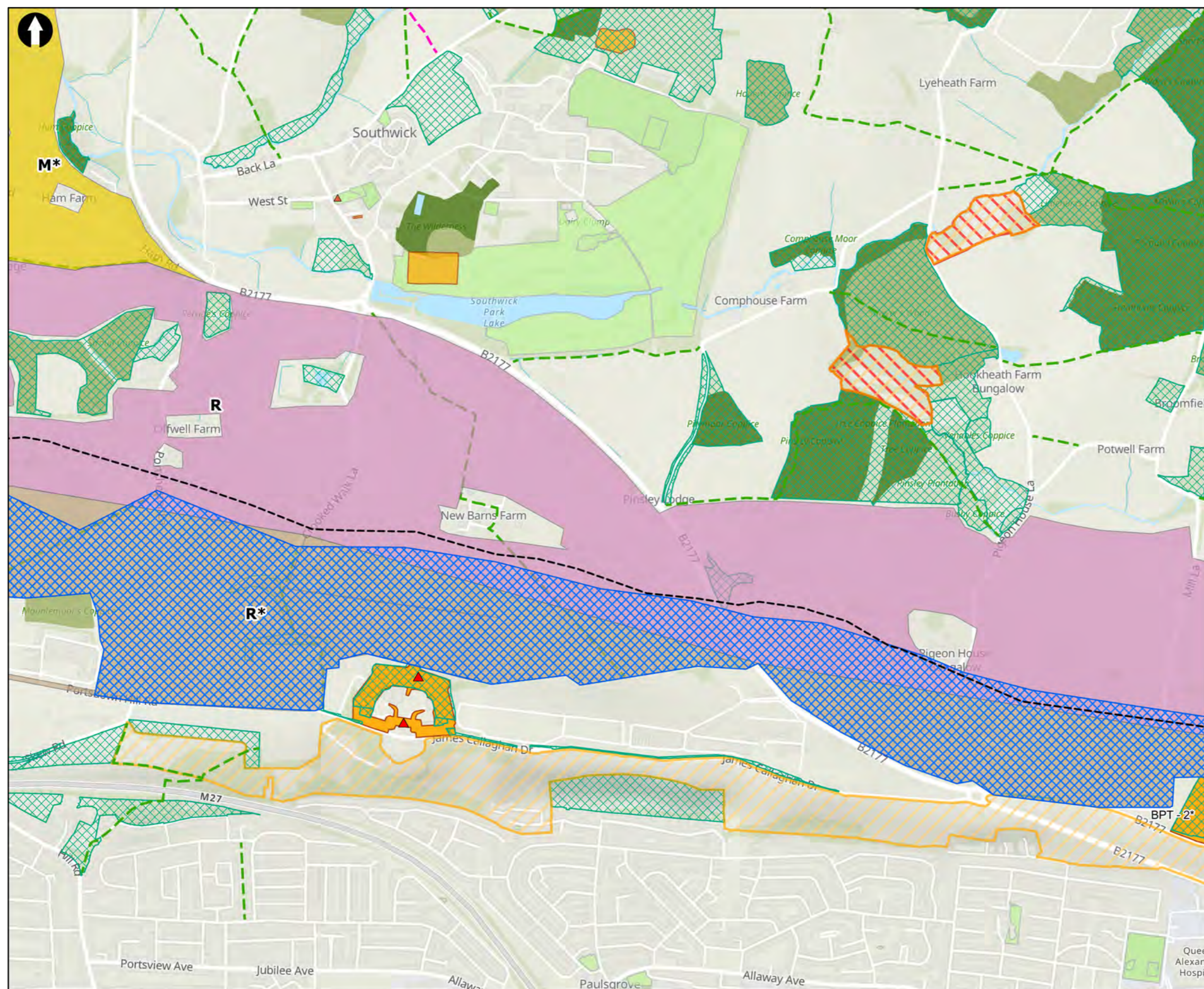
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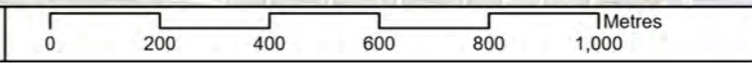


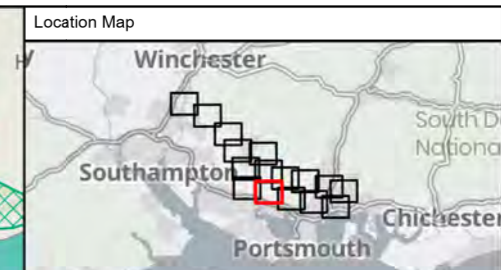
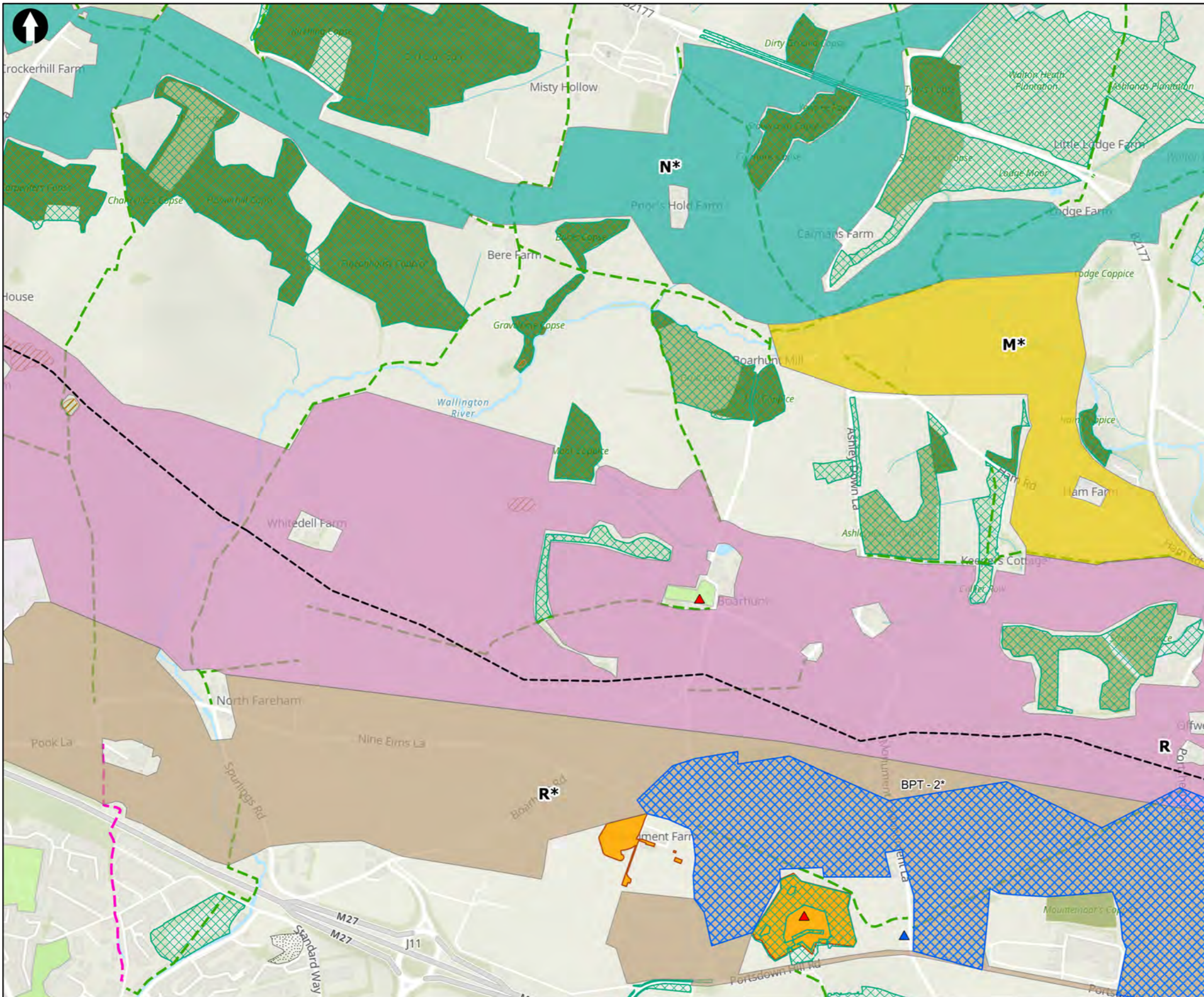
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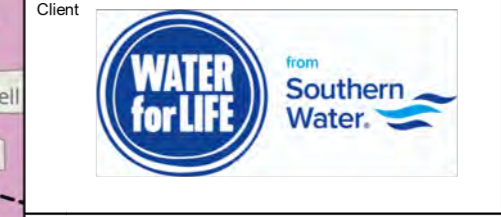
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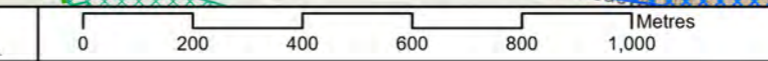


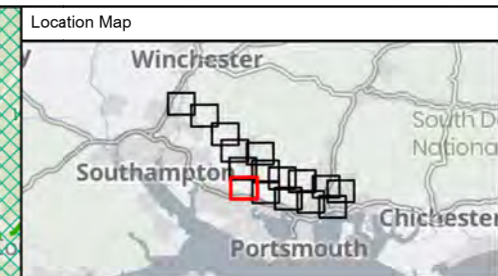
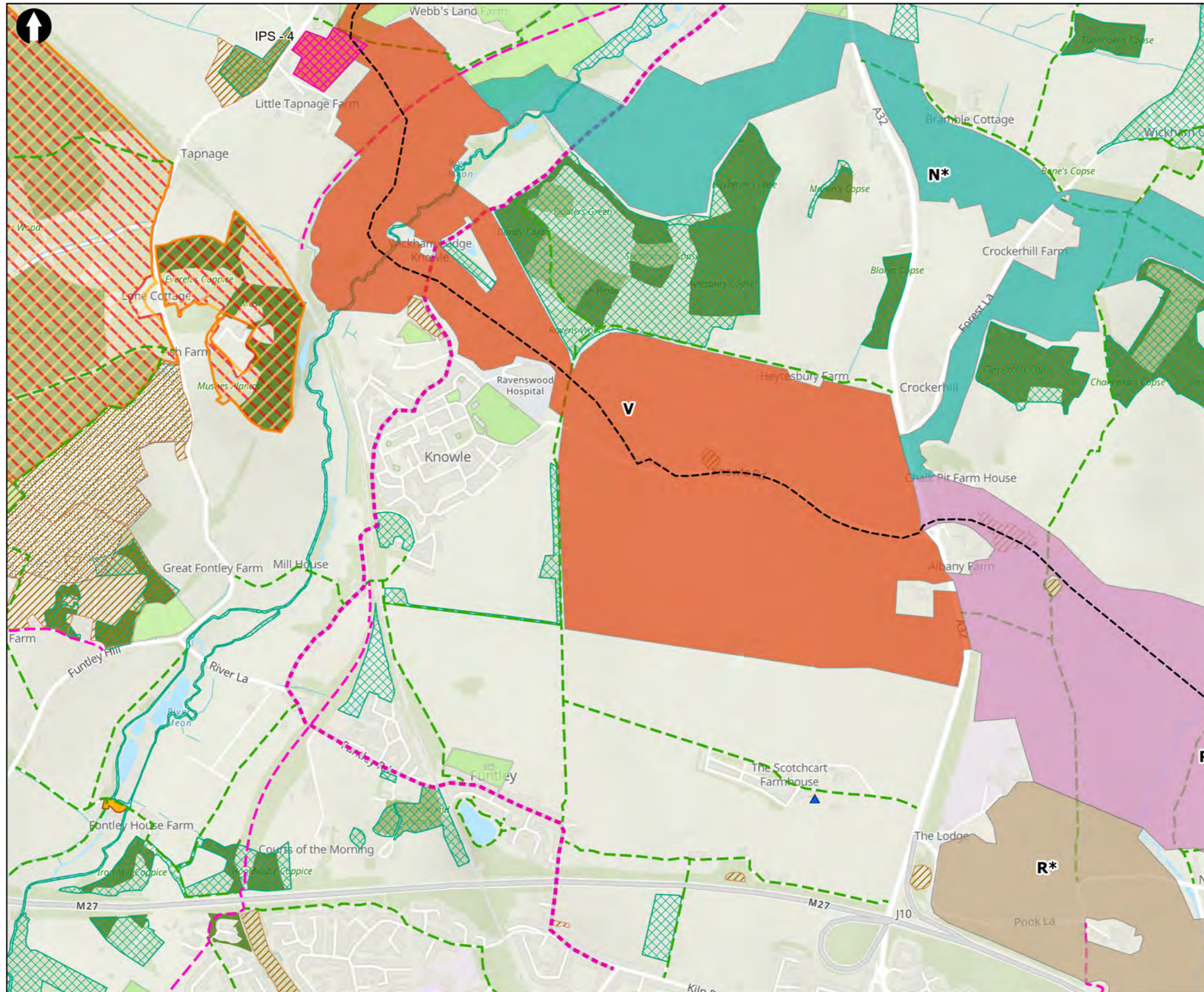
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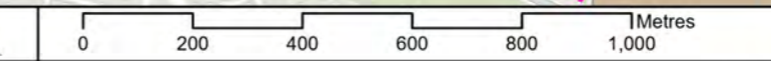


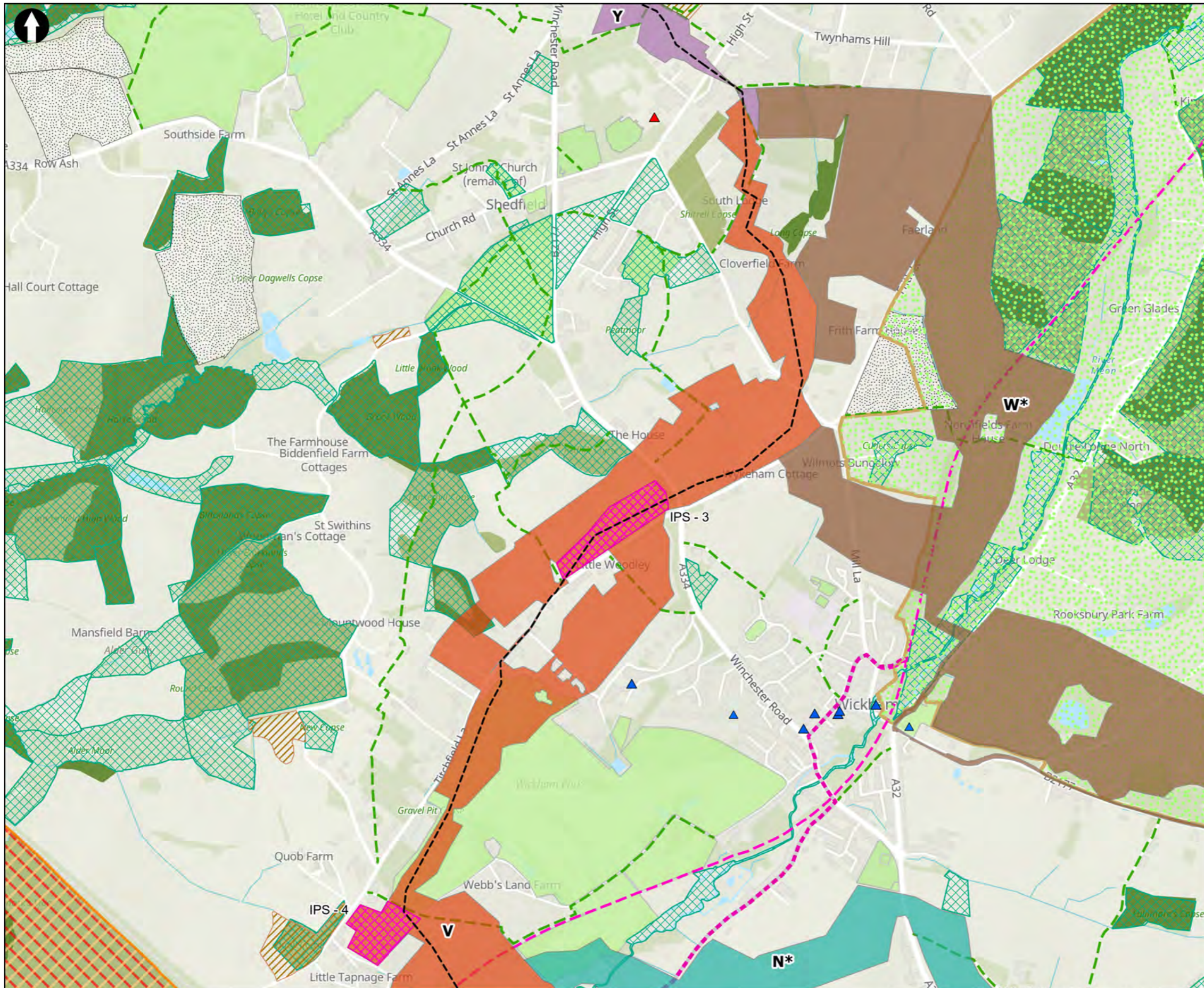
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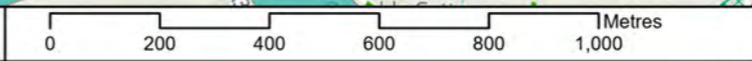
Rev	Date	Drawn	Description	Ch'k'd	App'd
01	28/06/2022	AW	For Information	HDC	JK



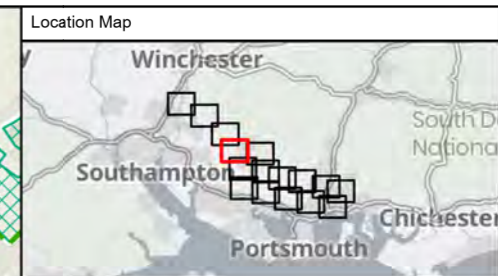
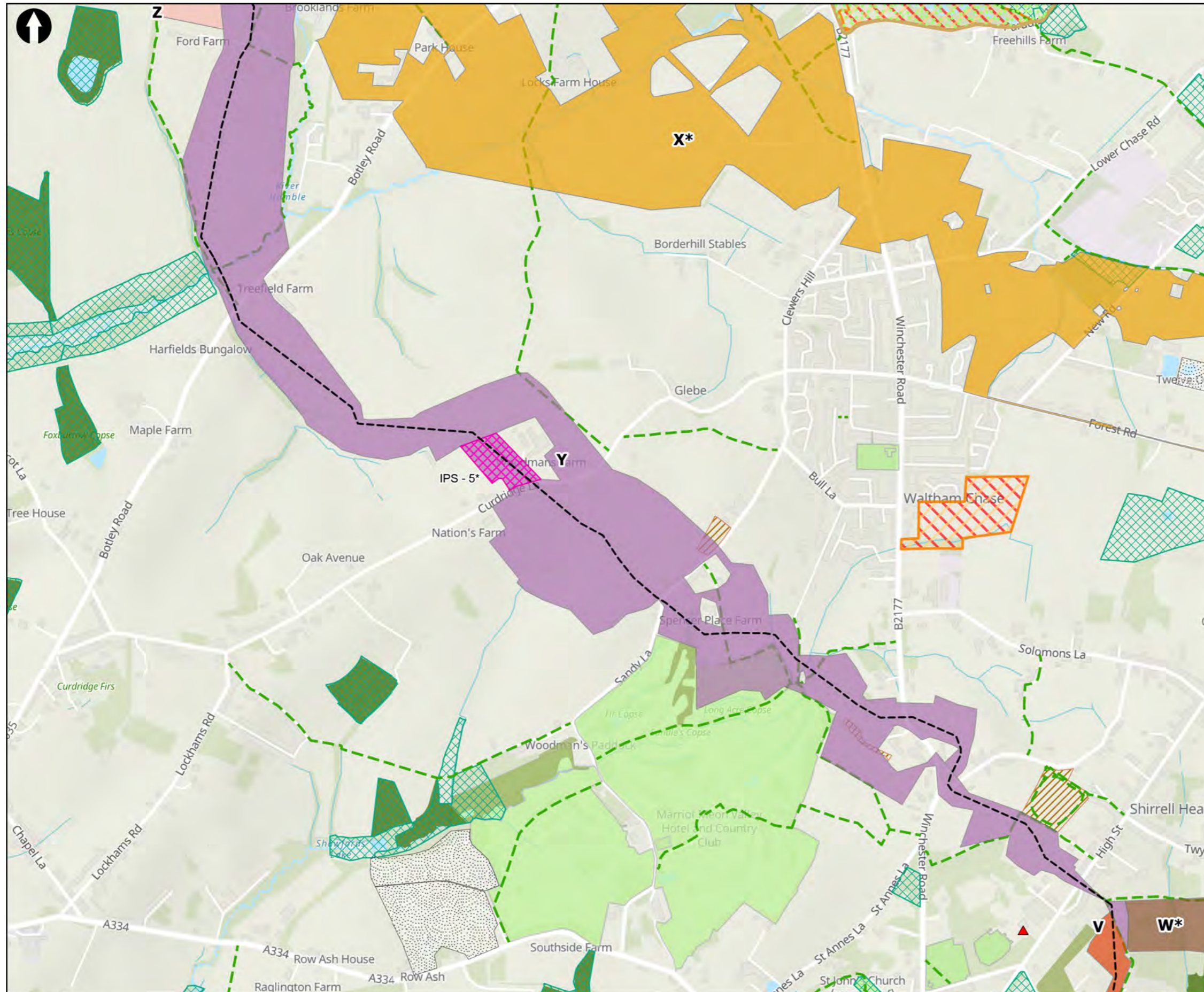
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 7 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
Scale at A3	Status	Rev	01	Security	STD

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Drawing Number
 710166-SWS-XX-XX-DR-Z-00817



Key to Symbols

Budds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
Preferred Corridor	Permitted Waste Sites Authorised Landfill Site
O	Ancient & Semi-Natural Woodland
P	Ancient Replanted Woodland
R	Ramsar Sites
V	Sites of Special Scientific Interest (SSSI)
Y	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)
Corridor Zones Not Being Progressed	Sites of Importance for Nature Conservation (SINCs)
M	Registered Park or Garden - 1 and 2*
N	GreenSpace
O	Potential Crown Land
P	Areas of Outstanding Natural Beauty (AONB)
Q	National Nature Reserve (NNR)
R	National Parks
S	Railways
T	Public Rights of Way (Hampshire)
W	Byway Open to All Traffic
X	Bridleway
Above Ground Plant Zones	Footpath
Break Pressure Tank	Restricted Byway
Intermediate Pumping Station	
High Lift Pumping Station	

* Currently Not Being Progressed

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Rev	Date	Drawn	Description	Ch'k'd	App'd
01	28/06/2022	AW	For Information	HDC	JK

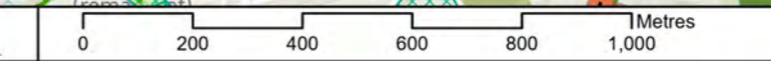


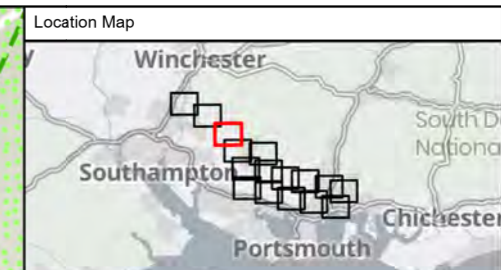
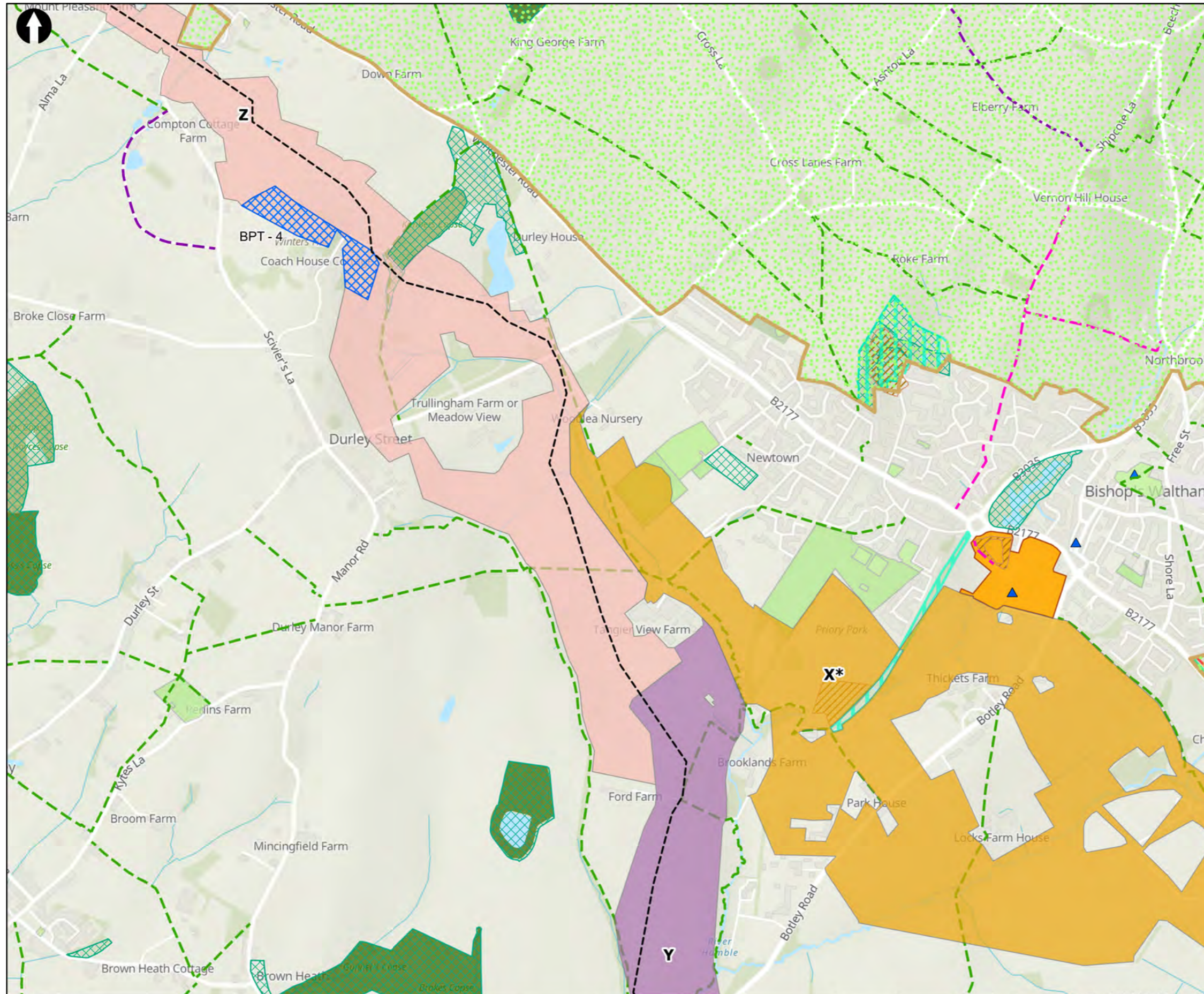
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 8 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
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Drawing Number
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Key to Symbols

Buds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
Preferred Corridor	Permitted Waste Sites Authorised Landfill Site
O	Ancient & Semi-Natural Woodland
P	Ancient Replanted Woodland
R	Ramsar Sites
V	Sites of Special Scientific Interest (SSSI)
Y	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)
Corridor Zones Not Being Progressed	Sites of Importance for Nature Conservation (SINCs)
M	Registered Park or Garden - 1 and 2*
N	GreenSpace
O	Potential Crown Land
P	Areas of Outstanding Natural Beauty (AONB)
Q	National Nature Reserve (NNR)
R	National Parks
S	Public Rights of Way (Hampshire)
T	Byway Open to All Traffic
W	Bridleway
X	Footpath
Above Ground Plant Zones	Restricted Byway
Break Pressure Tank	
Intermediate Pumping Station	
High Lift Pumping Station	

* Currently Not Being Progressed

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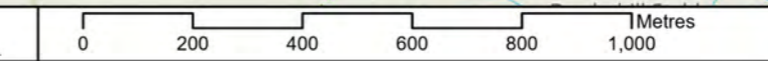
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Rev	Date	Drawn	Description	Ch'k'd	App'd



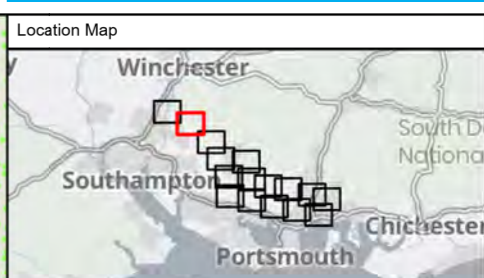
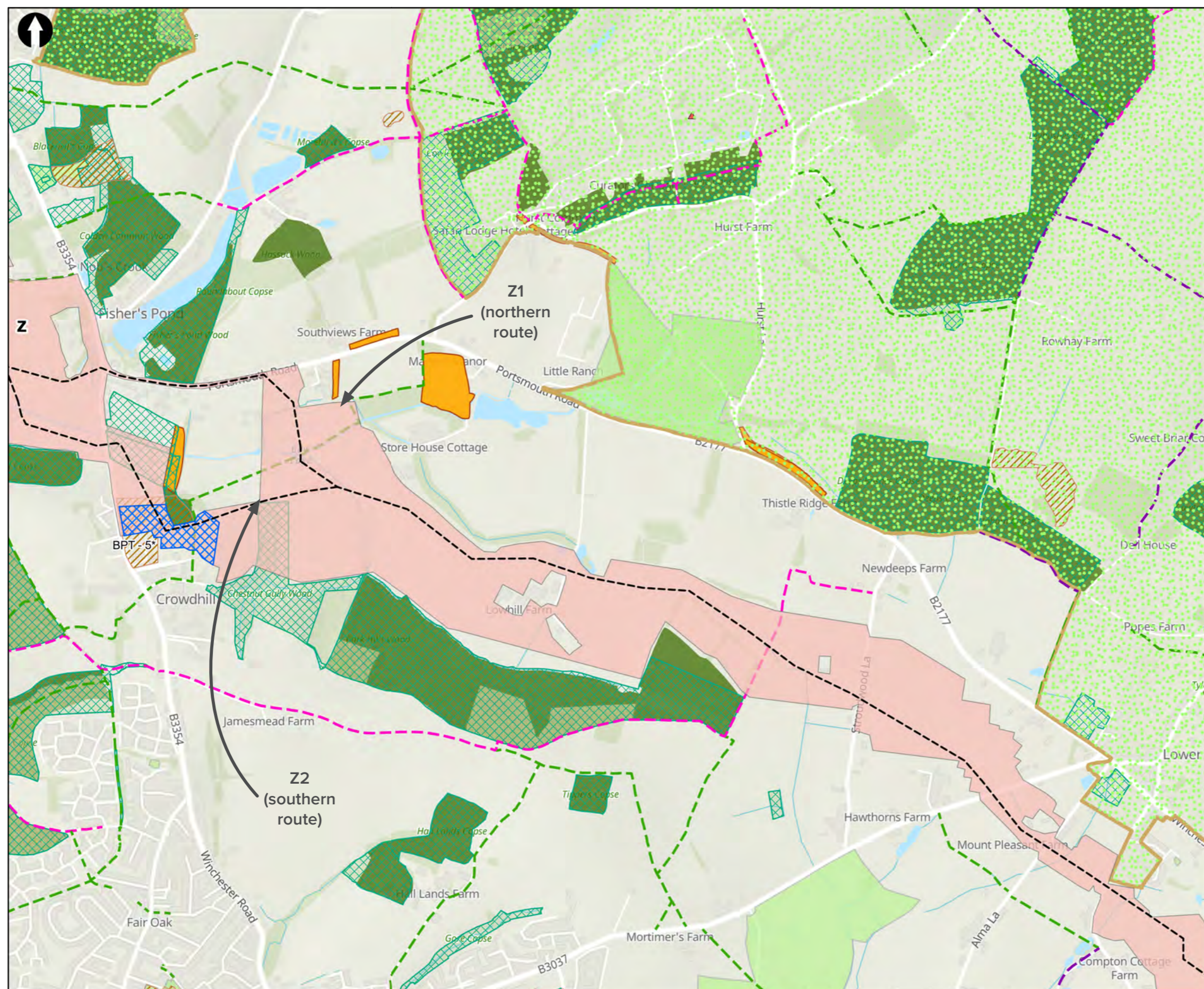
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 9 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
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Drawing Number
 710166-SWS-XX-XX-DR-Z-00819



Key to Symbols

Budds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
Preferred Corridor	Permitted Waste Sites Authorised Landfill Site
O	Ancient & Semi-Natural Woodland
P	Ancient Replanted Woodland
R	Ramsar Sites
V	Sites of Special Scientific Interest (SSSI)
Y	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)
Corridor Zones Not Being Progressed	Sites of Importance for Nature Conservation (SINCS)
M	Registered Park or Garden - 1 and 2*
N	GreenSpace
O	Potential Crown Land
P	Areas of Outstanding Natural Beauty (AONB)
Q	National Nature Reserve (NNR)
R	National Parks
S	Railways
T	Public Rights of Way (Hampshire)
W	Byway Open to All Traffic
X	Bridleway
Break Pressure Tank	Footpath
Intermediate Pumping Station	Restricted Byway
High Lift Pumping Station	

* Currently Not Being Progressed

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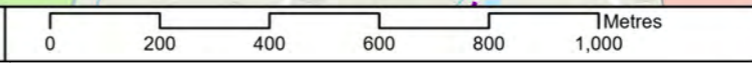
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Rev	Date	Drawn	Description	Ch'k'd	App'd



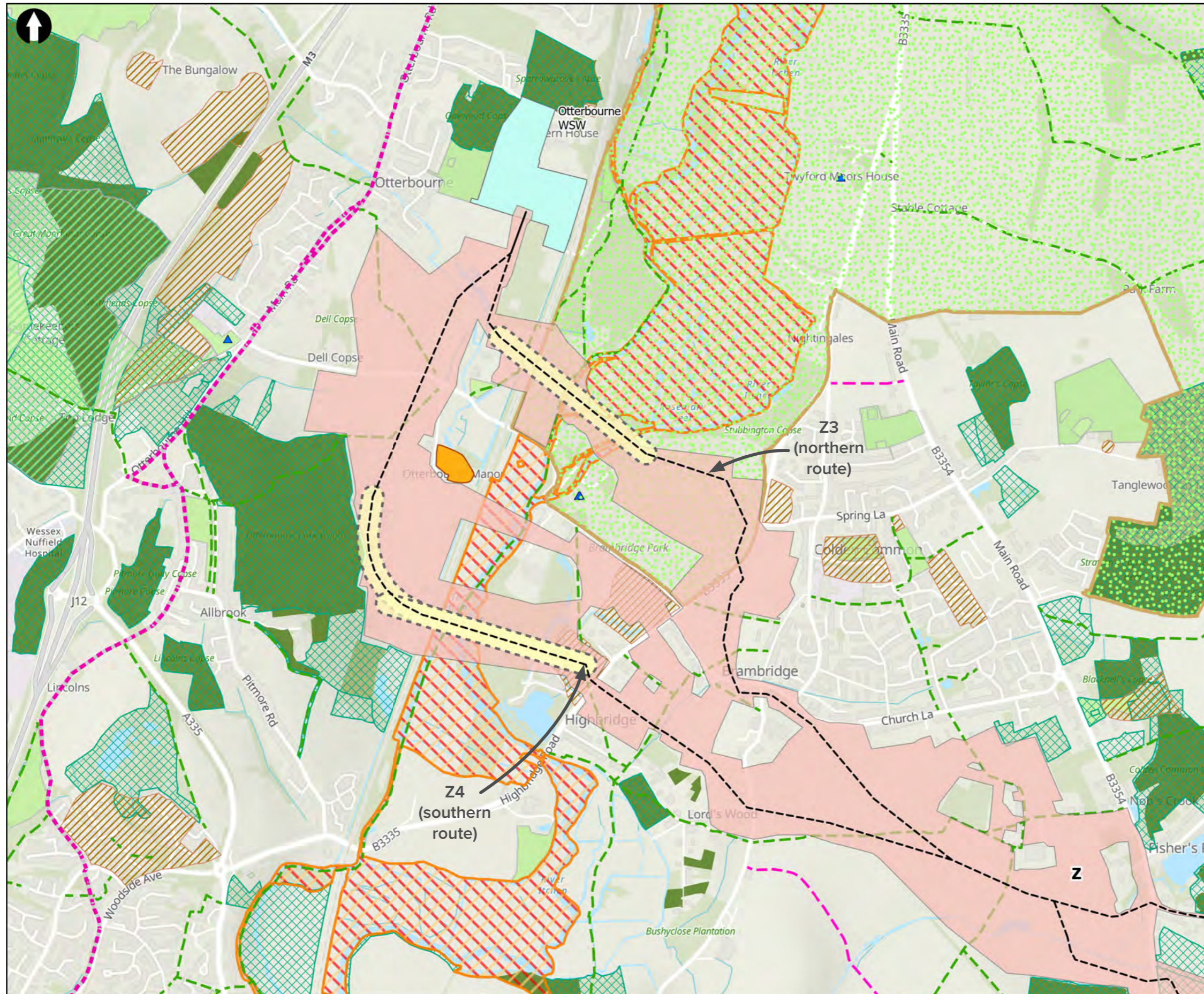
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 10 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
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Drawing Number
 710166-SWS-XX-XX-DR-Z-00820



Key to Symbols

Preferred Corridor

Corridor Zones Not Being Progressed

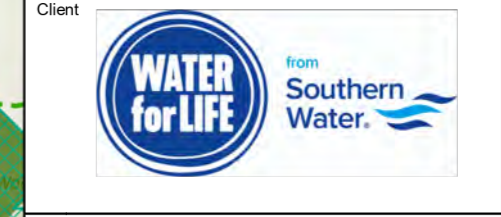
Above Ground Plant Zones

* Currently Not Being Progressed

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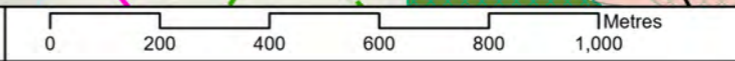
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01	28/06/2022	AW	For Information	HDC	JK



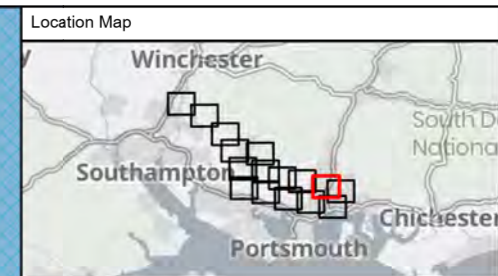
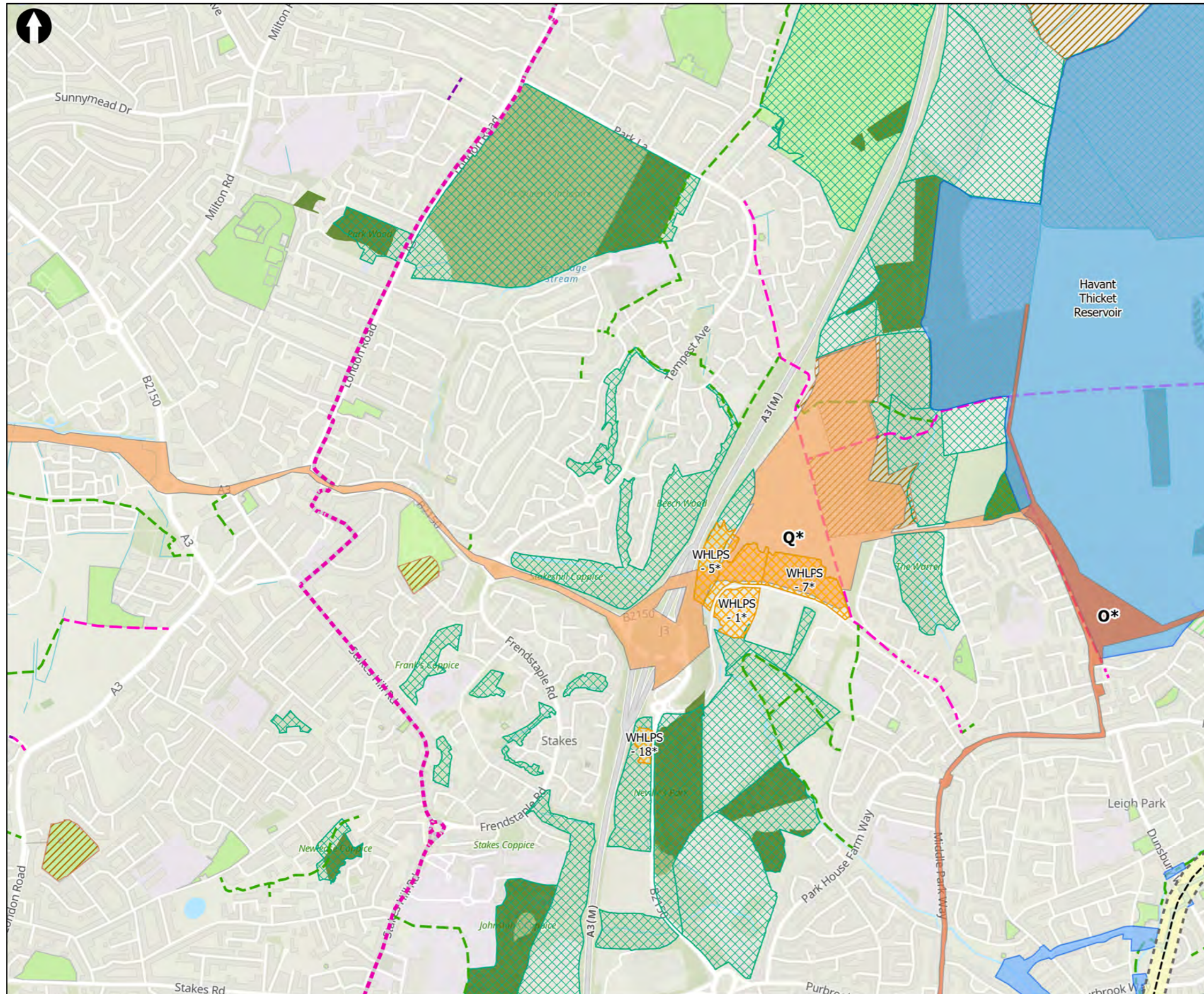
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 11 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
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Drawing Number
 710166-SWS-XX-XX-DR-Z-00821



Key to Symbols

Budds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
Preferred Corridor	Permitted Waste Sites Authorised Landfill Site
O	Ancient & Semi-Natural Woodland
P	Ancient Replanted Woodland
R	Ramsar Sites
V	Sites of Special Scientific Interest (SSSI)
Y	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)

Corridor Zones Not Being Progressed

M	Special Protection Area (SPA)
N	Sites of Importance for Nature Conservation (SINCs)
O	Registered Park or Garden - 1 and 2*
P	GreenSpace
Q	Potential Crown Land
R	Areas of Outstanding Natural Beauty (AONB)
S	National Nature Reserve (NNR)
T	National Parks
W	Railways
X	Public Rights of Way (Hampshire)

Above Ground Plant Zones

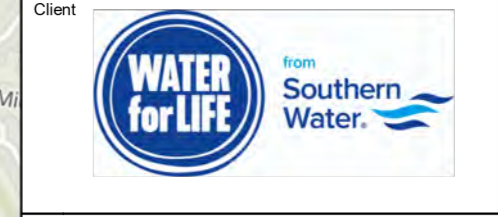
Break Pressure Tank	Byway Open to All Traffic
Intermediate Pumping Station	Bridleway
High Lift Pumping Station	Footpath
	Restricted Byway

* Currently Not Being Progressed

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01	28/06/2022	AW	For Information	HDC	JK
Rev	Date	Drawn	Description	Ch'k'd	App'd

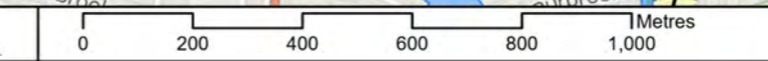


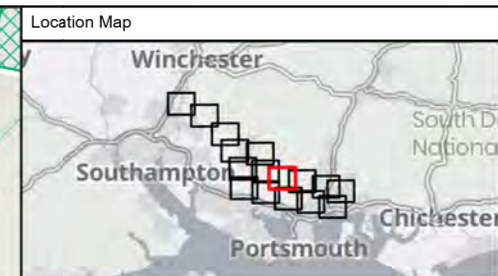
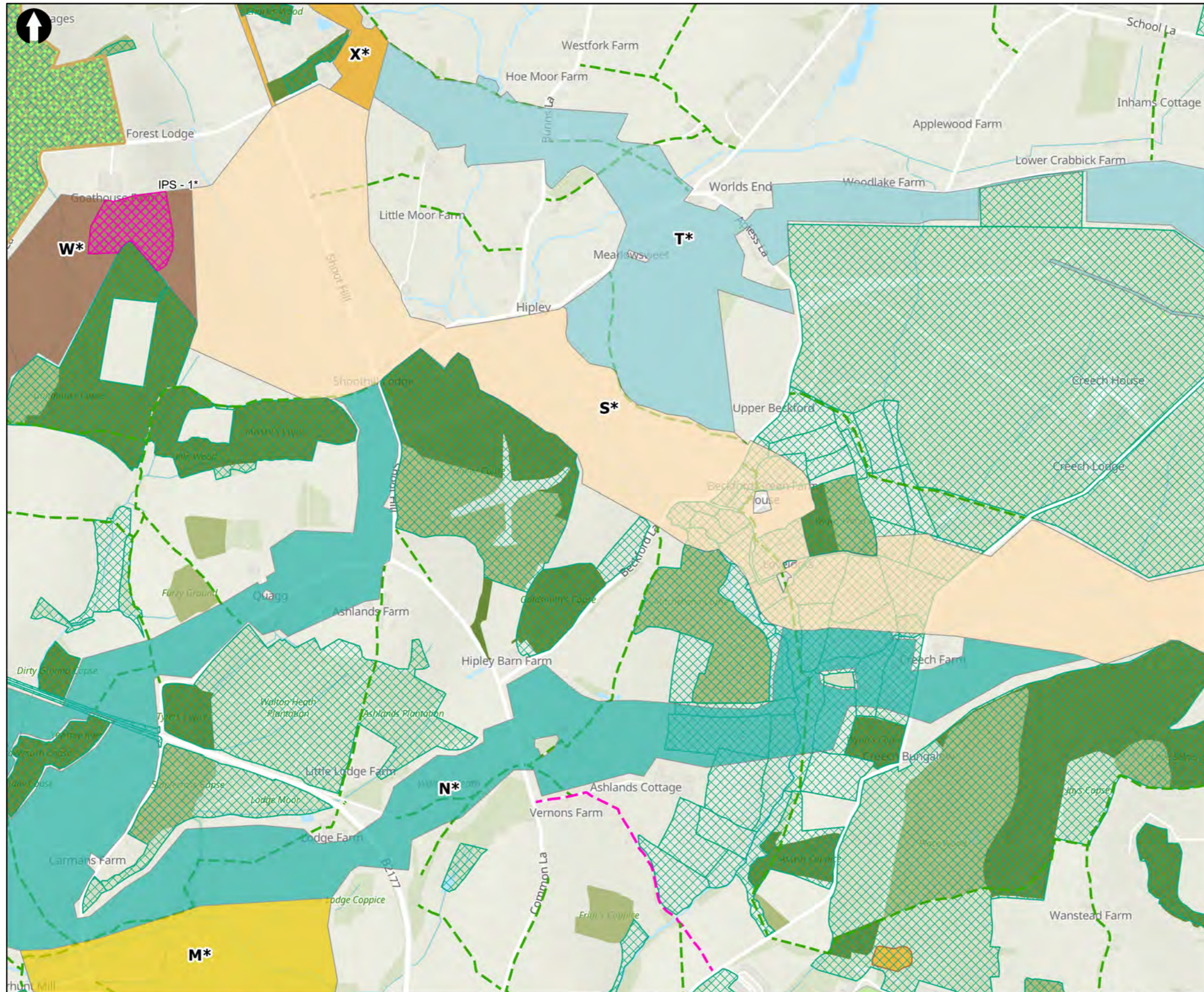
Title
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 Public Consultation
 Environmental Designations
 Sheet 12 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
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Key to Symbols

Budds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
	Permitted Waste Sites Authorised Landfill Site

Preferred Corridor

O	Ancient & Semi-Natural Woodland
P	Ancient Replanted Woodland
R	Ramsar Sites
V	Sites of Special Scientific Interest (SSSI)
Y	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)

Corridor Zones Not Being Progressed

M	Sites of Importance for Nature Conservation (SINCs)
N	Registered Park or Garden - 1 and 2*
O	Greenspace
P	Potential Crown Land
R	Areas of Outstanding Natural Beauty (AONB)
S	National Nature Reserve (NNR)
T	National Parks
W	Railways
X	Public Rights of Way (Hampshire)

Above Ground Plant Zones

Break Pressure Tank	Bypass Open to All Traffic
Intermediate Pumping Station	Bridleway
High Lift Pumping Station	Footpath
	Restricted Byway

* Currently Not Being Progressed

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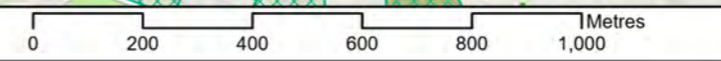


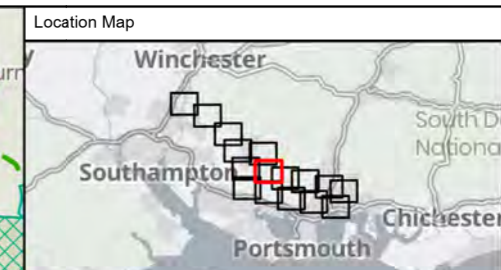
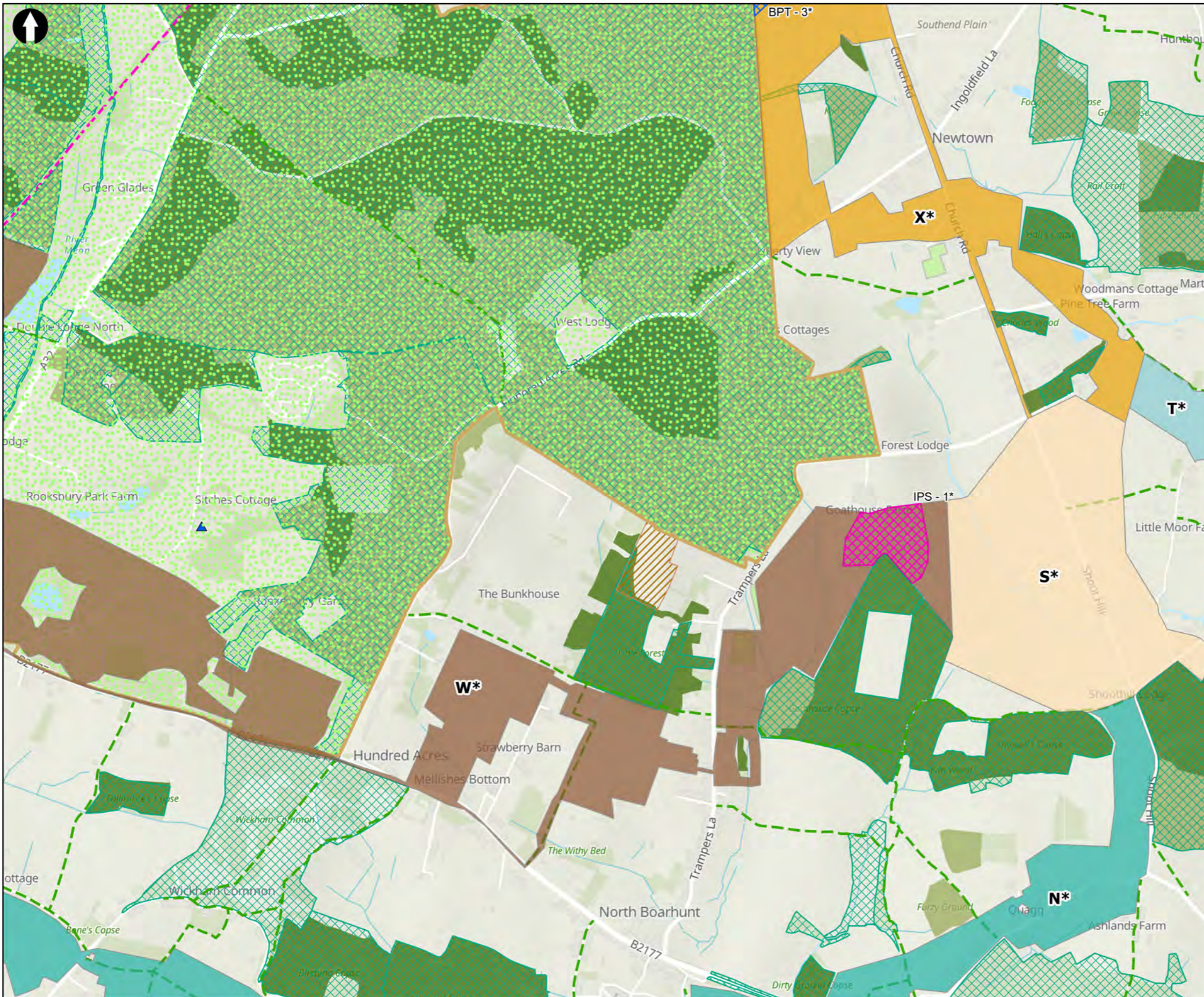
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 14 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
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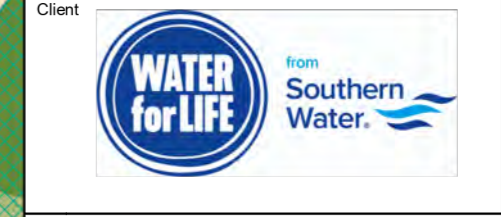
Key to Symbols

Budds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
Preferred Corridor	Permitted Waste Sites Authorised Landfill Site
O	Ancient & Semi-Natural Woodland
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R	Ramsar Sites
V	Sites of Special Scientific Interest (SSSI)
Y	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)
M	Sites of Importance for Nature Conservation (SINCS)
N	Registered Park or Garden - 1 and 2*
O	Greenspace
P	Potential Crown Land
Q	Areas of Outstanding Natural Beauty (AONB)
R	National Nature Reserve (NNR)
S	National Parks
T	Railways
W	Public Rights of Way (Hampshire)
X	Byway Open to All Traffic
Break Pressure Tank	Footpath
Intermediate Pumping Station	Restricted Byway
High Lift Pumping Station	

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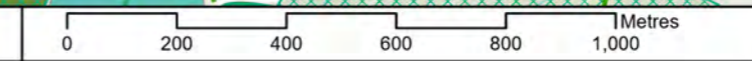
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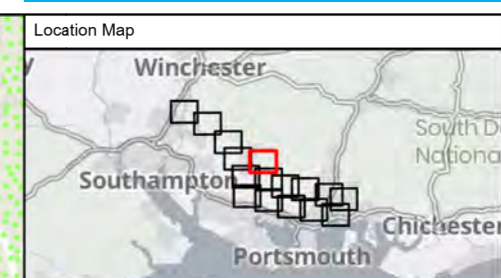
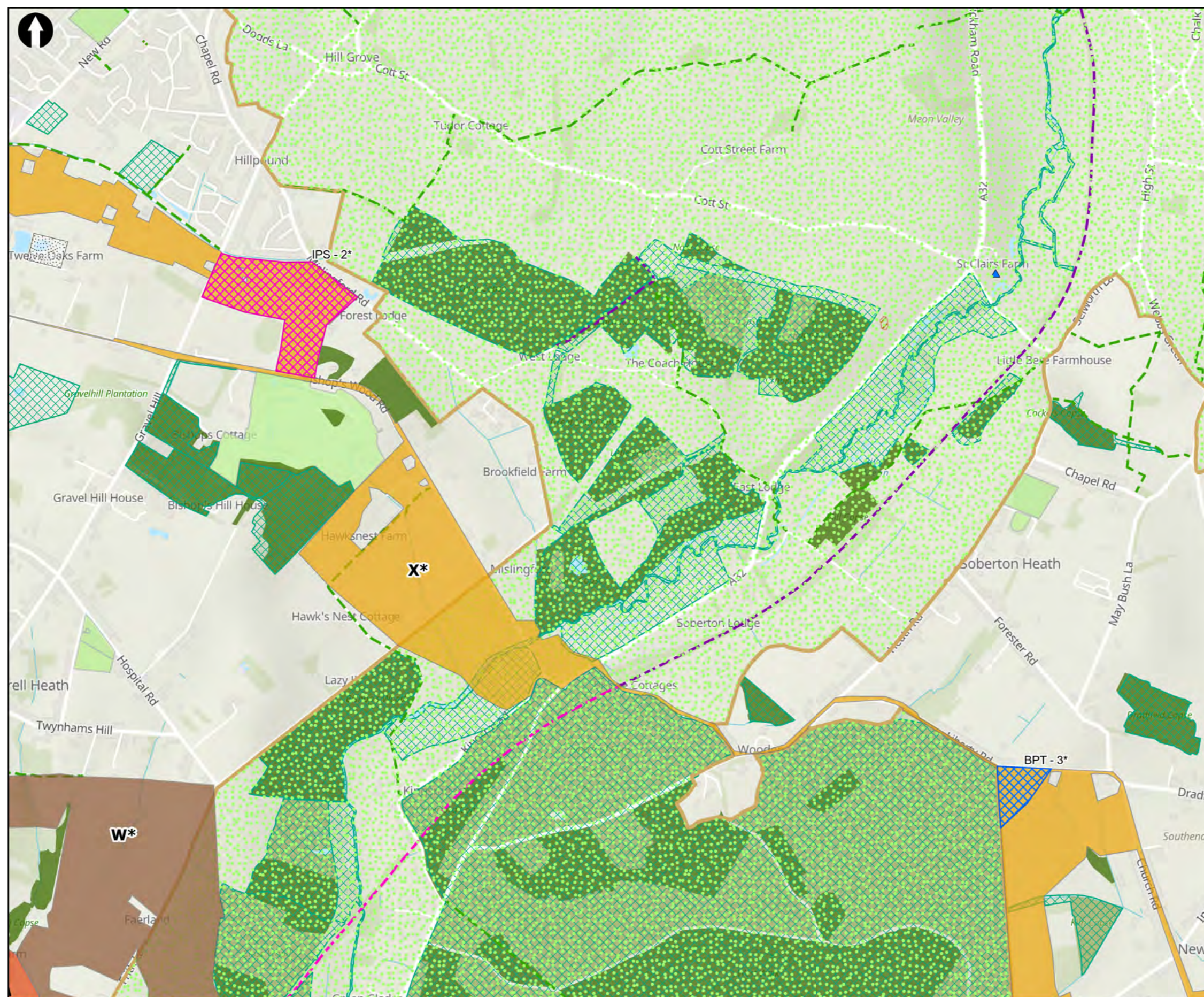
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 15 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
Scale at A3	Status	Rev	01	Security	STD

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Drawing Number
 710166-SWS-XX-XX-DR-Z-00825



Key to Symbols

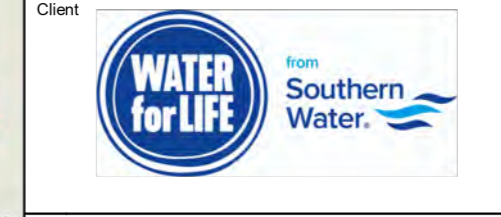
Budds Farm Waste Water Treatment Works	Grade I Listed Building
Water Recycling Plant	Grade II* Listed Building
Otterbourne Water Supply Works	National Cycle Network (Sustrans)
Tunnel Buffer (Zone of Influence)	National Trails
Best Engineering Solution Pipeline	Scheduled Monument
Route	Local Nature Reserve (LNR)
Planning Application area for Portsmouth Water reservoir and pipeline	Historic Landfill Sites
Permitted Waste Sites Authorised Landfill Site	Permitted Waste Sites Authorised Landfill Site
Preferred Corridor	Ancient & Semi-Natural Woodland
O	Ancient Replanted Woodland
P	Ramsar Sites
R	Sites of Special Scientific Interest (SSSI)
V	Groundwater Dependent Terrestrial Ecosystems
Z	Special Protection Area (SPA)
Corridor Zones Not Being Progressed	Sites of Importance for Nature Conservation (SINCs)
M	Registered Park or Garden - 1 and 2*
N	GreenSpace
O	Potential Crown Land
P	Areas of Outstanding Natural Beauty (AONB)
Q	National Nature Reserve (NNR)
R	National Parks
S	Railways
T	Public Rights of Way (Hampshire)
W	Byway Open to All Traffic
X	Bridleway
Break Pressure Tank	Footpath
Intermediate Pumping Station	Restricted Byway
High Lift Pumping Station	

* Currently Not Being Progressed

Notes

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Rev	Date	Drawn	Description	Ch'k'd	App'd

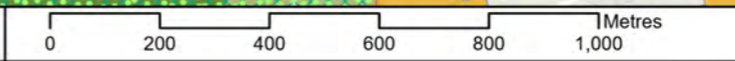


Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Environmental Designations
 Sheet 16 of 16

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
Scale at A3	Status	Rev	Security		
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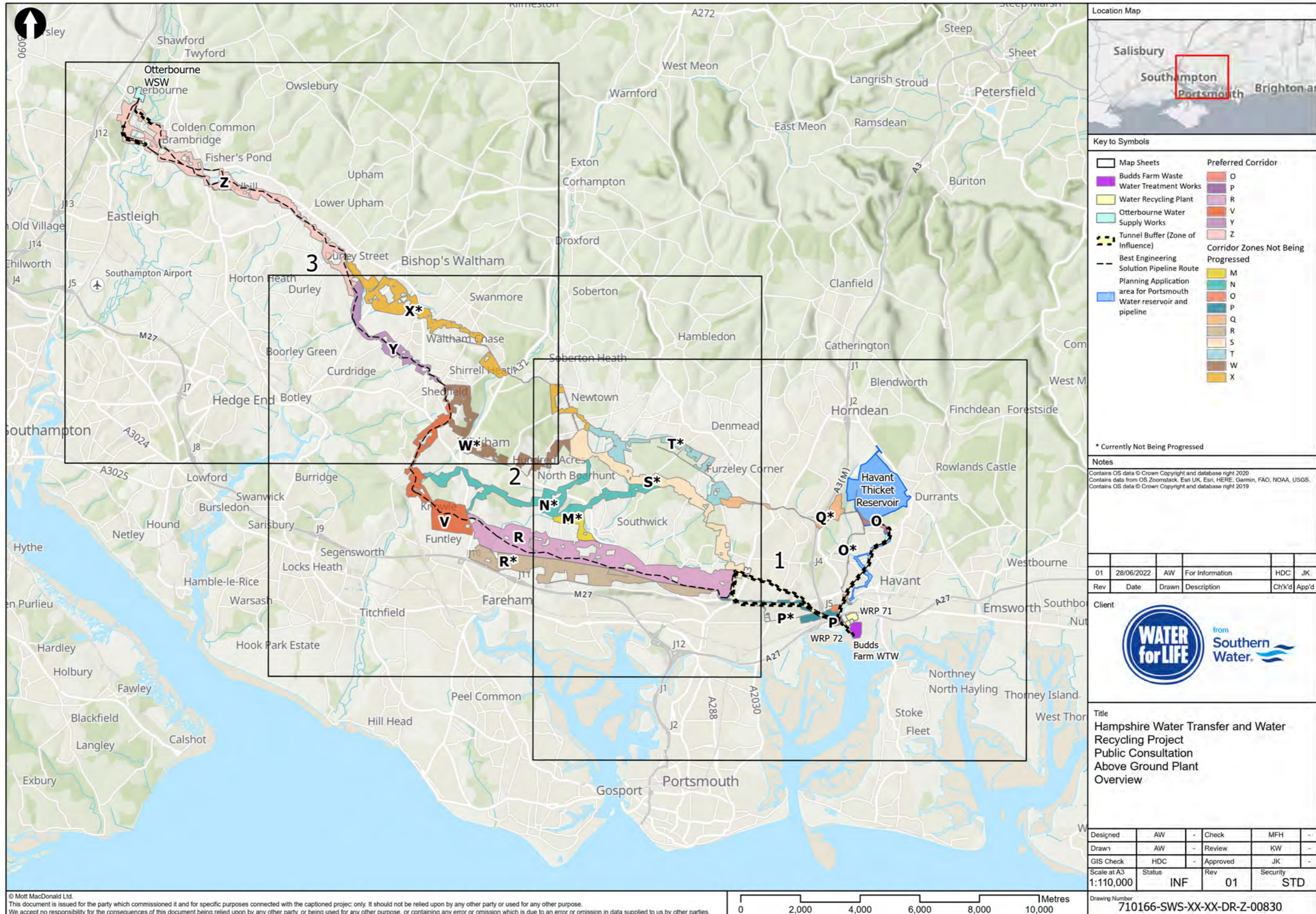
Drawing Number
 710166-SWS-XX-XX-DR-Z-00825

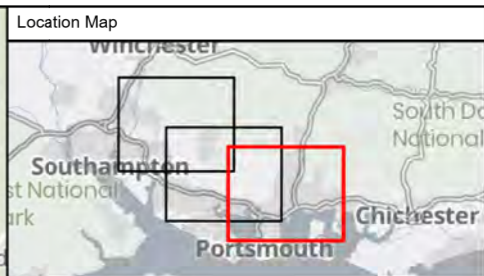
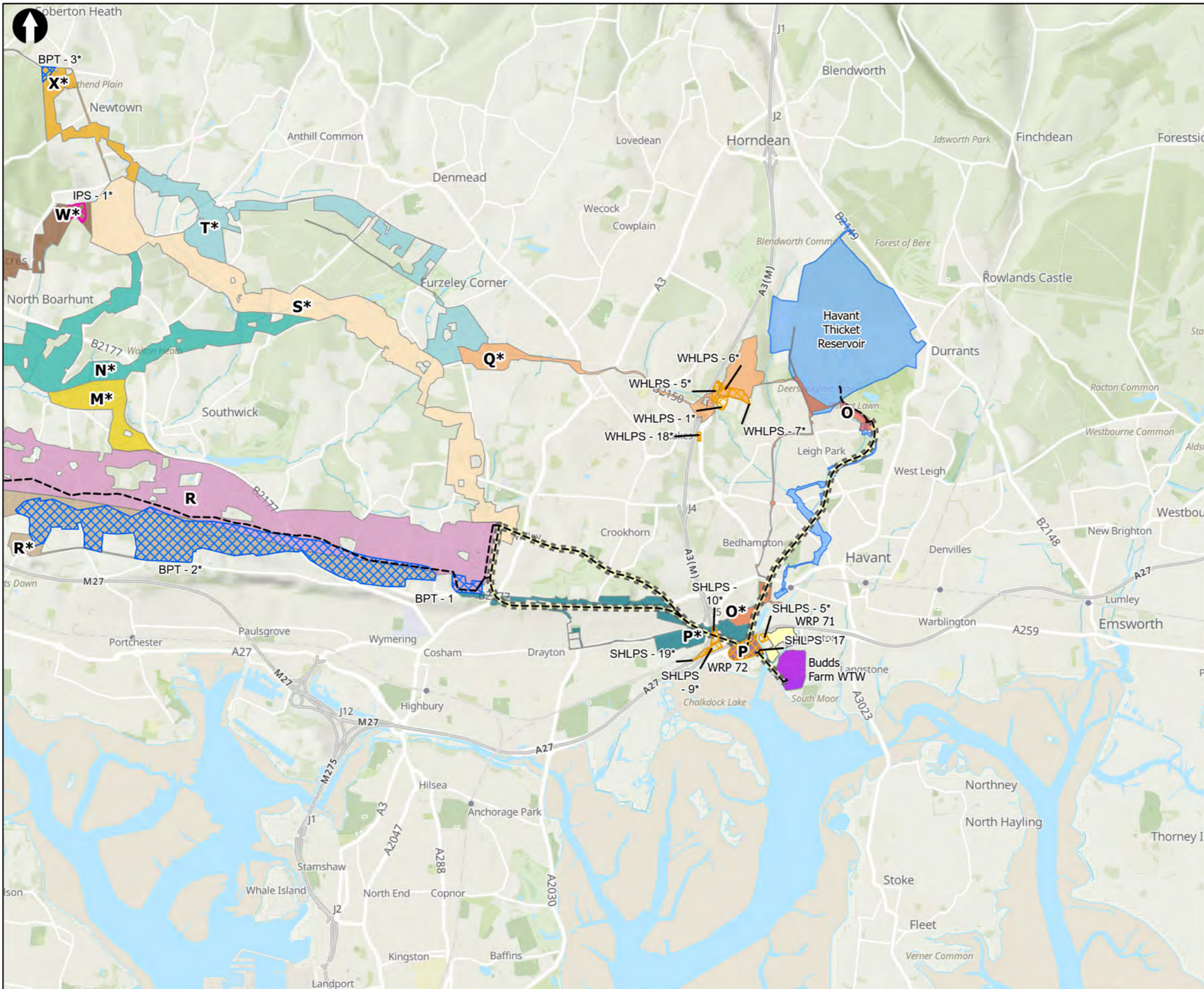
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Above ground plant







Key to Symbols

Budds Farm Waste Water Treatment Works	Corridor Zones Not Being Progressed
Water Recycling Plant	M
Otterbourne Water Supply Works	N
Tunnel Buffer (Zone of Influence)	O
Best Engineering Solution Pipeline Route	P
Planning Application area for Portsmouth	Q
Water reservoir and pipeline	R
	S
	T
	W
	X

Preferred Corridor

O
P
R
V
Y
Z

Above Ground Plant Zones

Break Pressure Tank
Intermediate Pumping Station
High Lift Pumping Station

* Currently Not Being Progressed

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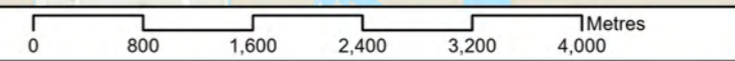
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Rev	Date	Drawn	Description	Ch'k'd	App'd



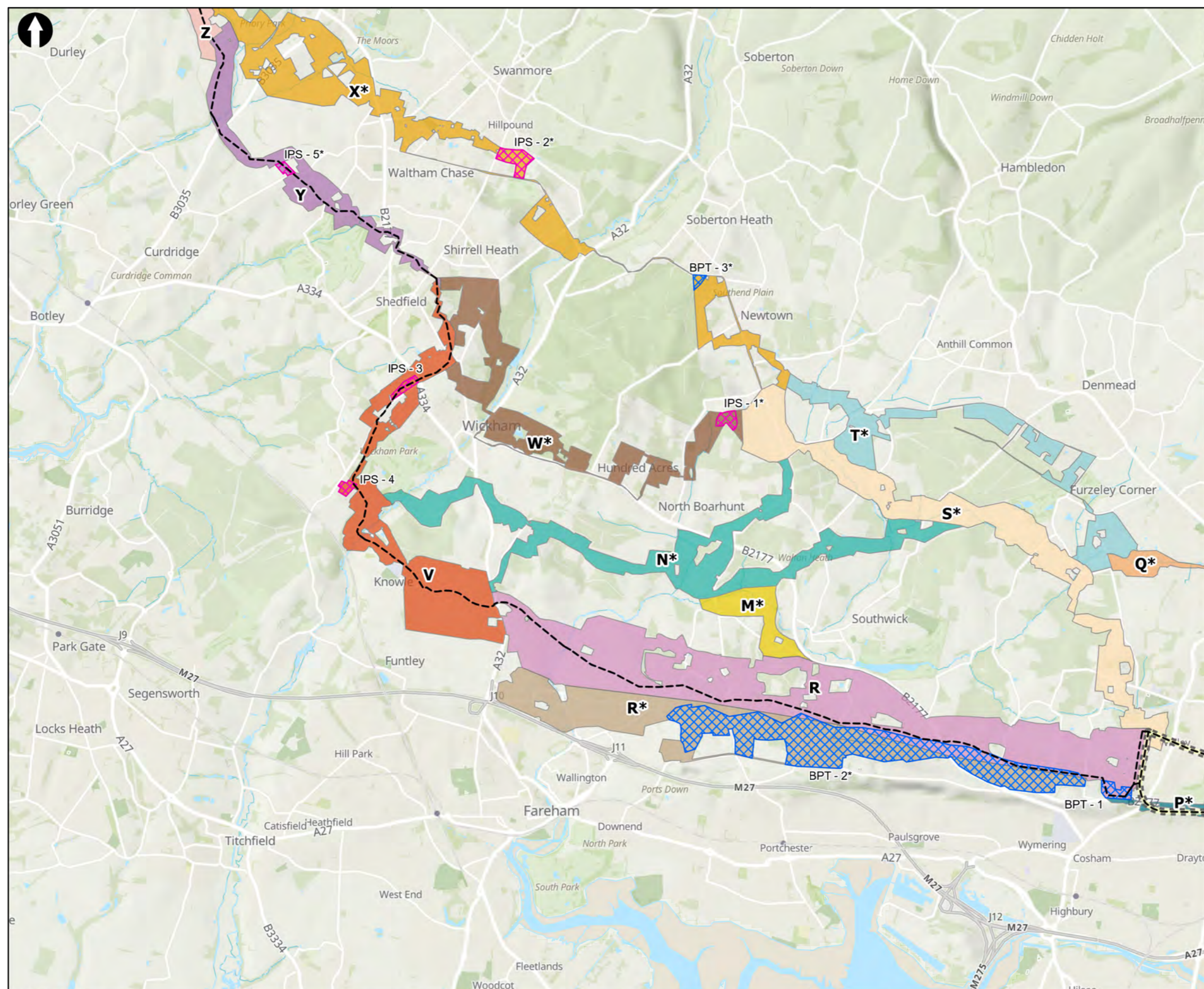
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Above Ground Plant
 Sheet 1 of 3

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
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Drawing Number
 710166-SWS-XX-XX-DR-Z-00831



Key to Symbols

Budds Farm Waste Water Treatment Works	Corridor Zones Not Being Progressed
Water Recycling Plant	M
Otterbourne Water Supply Works	N
Tunnel Buffer (Zone of Influence)	O
Best Engineering Solution Pipeline Route	P
Planning Application area for Portsmouth	Q
Water reservoir and pipeline	R
	S
	T
	W
	X

Preferred Corridor

	O
	P
	R
	V
	Y
	Z

Above Ground Plant Zones

	Break Pressure Tank
	Intermediate Pumping Station
	High Lift Pumping Station

* Currently Not Being Progressed

Notes

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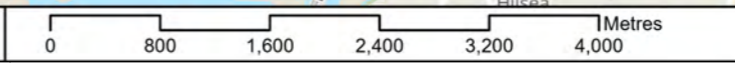
01	28/06/2022	AW	For Information	HDC	JK
Rev	Date	Drawn	Description	Ch'k'd	App'd



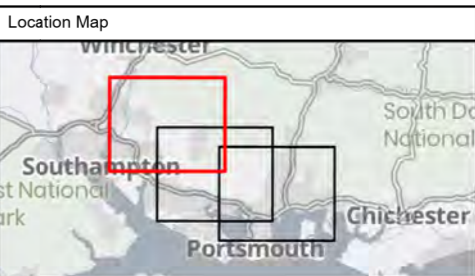
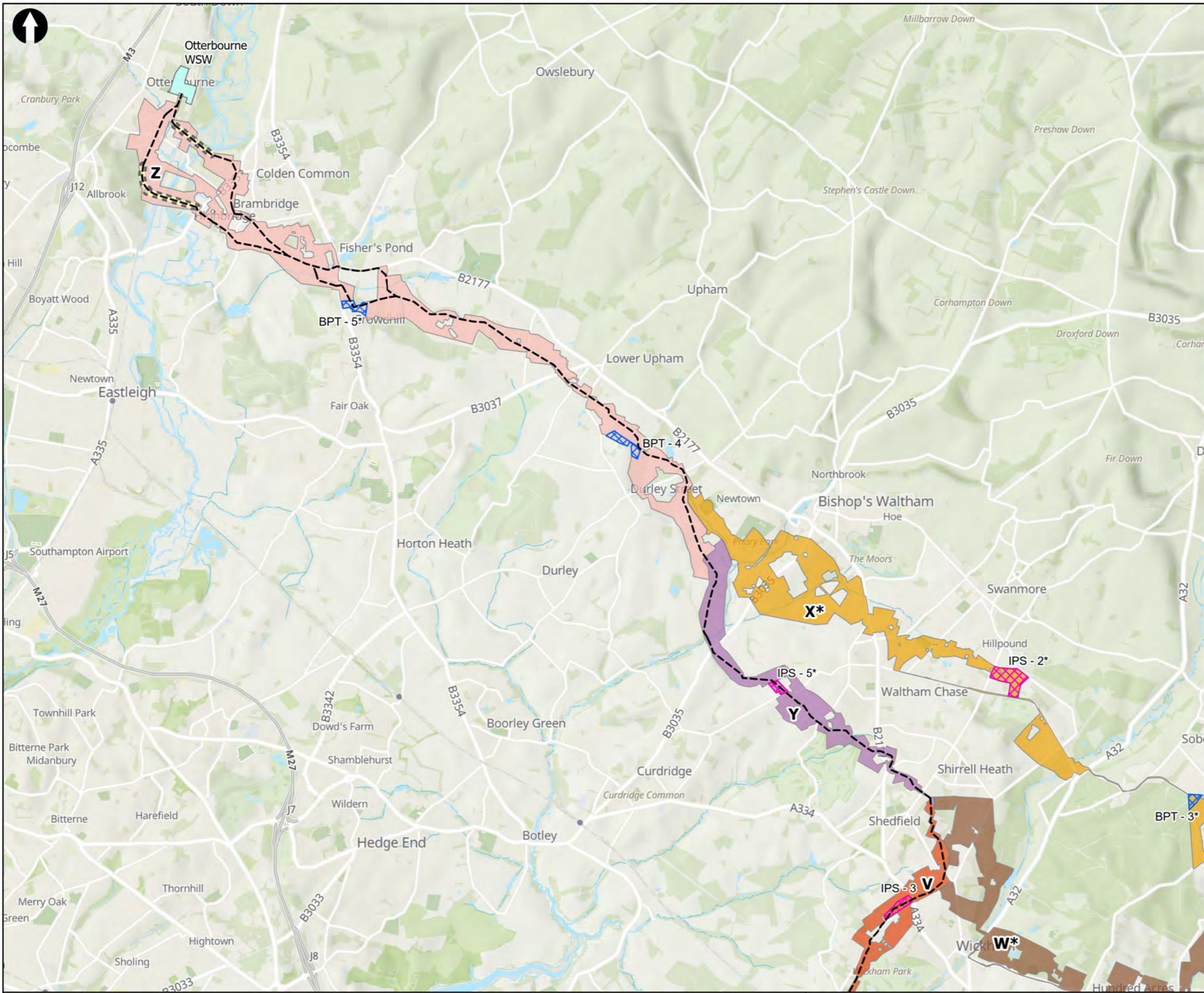
Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Above Ground Plant
 Sheet 2 of 3

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
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Drawing Number
 710166-SWS-XX-XX-DR-Z-00832



Key to Symbols

Budds Farm Waste Water Treatment Works	Corridor Zones Not Being Progressed
Water Recycling Plant	M
Otterbourne Water Supply Works	N
Tunnel Buffer (Zone of Influence)	O
Best Engineering Solution Pipeline Route	P
Planning Application area for Portsmouth	Q
Water reservoir and pipeline	R
	S
	T
	W
	X

Preferred Corridor

O	Break Pressure Tank
P	Intermediate Pumping Station
R	High Lift Pumping Station
V	
Y	
Z	

Above Ground Plant Zones

* Currently Not Being Progressed

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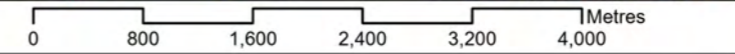
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Rev	Date	Drawn	Description	Ch'k'd	App'd



Title
 Hampshire Water Transfer and Water Recycling Project
 Public Consultation
 Above Ground Plant
 Sheet 3 of 3

Designed	AW	-	Check	MFH	-
Drawn	AW	-	Review	KW	-
GIS Check	HDC	-	Approved	JK	-
Scale at A3	Status	Rev	Security		
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